

KNOCKOUT BLOW?  
THE ARMY AIR FORCE'S OPERATIONS AGAINST PLOESTI AND  
BALIKPAPAN

BY  
JOHN G. BUNNELL

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## ABOUT THE AUTHOR

MAJOR JOHN G. BUNNELL WAS COMMISSIONED FROM THE UNITED STATES AIR FORCE ACADEMY IN 1990. GRADUATING FROM UNDERGRADUATE NAVIGATOR TRAINING IN 1991, HE WENT ON TO BECOME AN F-15E WEAPON SYSTEMS OFFICER. HE COMPLETED OPERATIONAL TOURS AT SEYMOUR JOHNSON AIR FORCE BASE, NORTH CAROLINA, RAF LAKENHEATH, UNITED KINGDOM, AND MOUNTAIN HOME AIR FORCE BASE, IDAHO. MAJOR BUNNELL ATTENDED THE USAF WEAPONS INSTRUCTOR COURSE IN 1999 AND RETURNED TO TEACH AT THE WEAPONS SCHOOL FROM 2001 UNTIL 2003. HE THEN ATTENDED THE US ARMY COMMAND AND GENERAL STAFF COLLEGE FOLLOWED BY THE AIR FORCE SCHOOL OF ADVANCED AIR AND SPACE STUDIES. MAJOR BUNNELL IS A SENIOR NAVIGATOR WITH OVER 2600 FLYING HOURS. HE HAS A BACHELOR'S DEGREE IN AERONAUTICAL ENGINEERING FROM THE US AIR FORCE ACADEMY, A MASTER'S DEGREE IN MILITARY STUDIES FROM AMERICAN MILITARY UNIVERSITY, AND A MASTER'S DEGREE IN AIRPOWER ART AND SCIENCE FROM THE SCHOOL OF ADVANCED AIR AND SPACE STUDIES. MAJOR BUNNELL IS CURRENTLY ASSIGNED TO THE WARFIGHTING HEADQUARTERS FOR THE UNITED STATES AIR FORCES IN EUROPE.

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Finally, I dedicate this work to my father, John Clarence Bunnell, who passed away during this paper's development.

## ABSTRACT

THIS STUDY ANALYZES THE US ARMY AIR FORCE'S PLOESTI AND BALIKPAPAN OIL REFINERY BOMBING OPERATIONS IN WW II. THE AUTHOR DETERMINES THAT THESE OPERATIONS HIGHLIGHT ORGANIZATIONAL AND LEADERSHIP DIFFERENCES THAT HAVE IMPLICATIONS FOR TODAY. THE WRITER FIRST RECOUNTS THE 1943 LOW-LEVEL RAID AGAINST PLOESTI. THE CONCLUSION IS THAT THE STRATEGIC AND TACTICAL CONCEPTS FOR THIS FIRST RAID WERE FLAWED, LEADING TO HEAVY LOSSES WITHOUT ANY APPRECIABLE BENEFIT. THE AUTHOR THEN DESCRIBES THE US STRATEGIC AIR FORCE'S SUSTAINED OPERATIONS AGAINST PLOESTI DURING 1944. THIS EXAMINATION SHOWS THAT THE AMERICANS LINKED THESE ATTACKS WITH A MORE REALISTIC STRATEGY AND THUS CONTRIBUTED SIGNIFICANTLY TO ALLIED WAR AIMS. HOWEVER, SLOW TACTICAL CHANGE CHARACTERIZED THE 1944 OPERATIONS, LEADING TO HEAVY CUMULATIVE LOSSES IN THE PURSUIT OF STRATEGIC EFFECTS. THE AUTHOR NEXT TURNS TO THE SURPRISINGLY PARALLEL BALIKPAPAN OPERATION IN THE PACIFIC. THE WRITER INITIALLY RECOUNTS THE FIRST TWO LARGE-SCALE BOMBING OPERATIONS DURING SEPTEMBER AND OCTOBER 1944. THE CONCLUSION IS THAT THESE INITIAL OPERATIONS, LIKE THE FIRST PLOESTI ATTACK, CONTAINED MAJOR STRATEGIC AND TACTICAL FLAWS. THE AUTHOR THEN HIGHLIGHTS HOW FEAF RADICALLY REVAMPED IT TACTICS AND OVERWHELMED THE DEFENSES IN THE FOLLOWING RAIDS. HOWEVER, FEAF'S STRATEGY REMAINED FLAWED, THUS THE RAIDS CONTRIBUTED LITTLE TO THE DEFEAT OF JAPAN. IN THE LAST SECTION, THE AUTHOR EXPLORES THE DISSIMILARITY IN THE OUTCOME OF THE OPERATIONS. HE CONCLUDES THAT USSTAF, WITH ITS STRATEGICALLY-FOCUSED LEADER AND LARGE BUREAUCRATIC ORGANIZATION, WAS WELL EQUIPPED TO DEVELOP STRATEGY BUT NOT PREDISPOSED FOR RAPID TACTICAL ADAPTATION. FEAF, ON THE OTHER HAND, WITH ITS TACTICALLY-FOCUSED LEADER AND RELATIVELY FLAT ORGANIZATIONAL STRUCTURE, WAS OPTIMIZED FOR TACTICAL INNOVATION BUT WAS ILL-PREPARED TO LINK THESE OPERATIONS WITH A BROADER PURPOSE.

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## INTRODUCTION

*HE WHO OWNS THE OIL OWNS THE WORLD, FOR HE WILL RULE THE SEA BY MEANS OF THE HEAVY OILS, THE AIR BY THE MEANS OF THE ULTRA-REFINED OILS, AND THE LAND BY MEANS OF PETROL AND THE ILLUMINATING OILS. AND, IN ADDITION TO THESE, HE WILL RULE HIS FELLOW MEN IN AN ECONOMIC SENSE, BY REASON OF THE FANTASTIC WEALTH HE WILL DERIVE FROM OIL.*

*HENRI BERENGER, 1921*

THE GREAT CONFLAGRATION THAT ENGULFED THE WORLD TWO DECADES LATER REVEALED THE WISDOM OF BERENGER'S QUOTE. OIL WAS THE LIFEBLOOD OF THE MECHANIZED ARMIES, NAVIES, AND AIR FORCES THAT RANGED ACROSS THE PLANET DURING WORLD WAR II, WHETHER THEY FOUGHT IN THE CAUSE OF DEMOCRACY, COMMUNISM, COLONIALISM, OR FASCISM. PETROLEUM WAS A PARTICULARLY CRITICAL ASSET FOR THE AXIS POWERS, AS THEY CONTROLLED JUST 3% OF THE WORLD'S PETROLEUM OUTPUT AND 4% OF THE REFINING CAPACITY AT THE BEGINNING OF THE WAR. FOR BOTH GERMANY AND JAPAN, THEREFORE, CONTROL OF OIL WAS A SIGNIFICANT WAR AIM, CAPTURED OIL WAS IMMEDIATELY MOBILIZED TO SUPPORT MILITARY OPERATIONS, AND THE CONTINUED SUPPLY OF FOREIGN OIL WAS CRITICAL TO THE WAR EFFORT.<sup>1</sup>

THROUGHOUT THE CONFLICT, GERMANY STROVE WITH ONLY LIMITED SUCCESS TO REDUCE THIS DEPENDENCE ON FOREIGN OIL. EVEN BEFORE THE WAR, GERMANY PIONEERED SYNTHETIC PETROLEUM REFINEMENT, AND ONE OF HER PURPOSES IN ACQUIRING THE SUDETENLAND AND CZECHOSLOVAKIA WAS TO GAIN ACCESS TO ADDITIONAL SOURCES OF LIGNITE.<sup>2</sup> EVEN SO, GERMANY PRODUCED ONLY HALF OF HER WARTIME REFINED PETROLEUM REQUIREMENT OF EIGHTEEN MILLION METRIC TONS.<sup>3</sup> THEREFORE, GERMANY WAS AN ACTIVE SUPPORTER OF A COUP IN ROMANIA IN 1940. GERMANY THOROUGHLY CONTROLLED THE RESULTING ANTONESCU GOVERNMENT, ENSURING UNINTERRUPTED AND MONOPOLISTIC ACCESS TO THE LARGEST SOURCES OF OIL IN EASTERN EUROPE.<sup>4</sup> EVEN THIS WAS NOT ENOUGH, AS THE FOCUS OF GERMANY'S 1942 EASTERN CAMPAIGN WAS NOT THE SOVIET GOVERNMENT IN MOSCOW, BUT THE RICH OIL FIELDS OF THE CAUCASUS.<sup>5</sup>

JAPAN'S PETROLEUM SITUATION WAS EVEN MORE CRITICAL. LACKING GERMANY'S BROWN COAL RESOURCES AND SYNTHETIC PETROLEUM TECHNOLOGY, JAPAN DEPENDED ON THE UNITED STATES FOR 90% OF HER OIL SUPPLIES. THE US OIL EMBARGO WAS THE PRECIPITATE CAUSE OF WAR IN THE PACIFIC, AND THE OIL FIELDS OF BORNEO, JAVA, SUMATRA, AND BURMA WERE THE PRIME TARGET OF JAPAN'S SOUTHERN OFFENSIVE. RETREATING ALLIED FORCES SABOTAGED THE FACILITIES, BUT JAPANESE ENGINEERS REPAIRED THE DAMAGE QUICKLY. IN THE FIRST YEAR OF OCCUPATION, THE NEWLY

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<sup>1</sup> Richard Overy, *Why the Allies Won* (New York: W.W. Norton and Co., 1995), 228.

<sup>2</sup> Overy, 228.

<sup>3</sup> ARMY AIR FORCE EVALUATION BOARD, *ARMY AIR FORCE EVALUATION BOARD REPORT – VOLUME VI: PLOESTI, MEDITERRANEAN THEATER OF OPERATIONS*, 2.

<sup>4</sup> Dugan and Stewart, 22-25.

<sup>5</sup> Overy, 228.

CAPTURED RESOURCES PRODUCED NEARLY AS MUCH OIL AS JAPAN IMPORTED FROM THE US BEFORE THE EMBARGO.<sup>6</sup>

IN LIGHT OF AXIS DEPENDENCE ON OIL, AMERICAN AIR STRATEGISTS IN BOTH THE EUROPEAN AND PACIFIC THEATERS FOCUSED ON IMPORTANT OIL COMPLEXES AS CRITICAL NODES TO DEFEAT THE ENEMY WAR EFFORT. IN EUROPE, THE FLIERS STALKED PLOESTI. THIRTY-FIVE MILES NORTH OF BUCHAREST AND AT THE FOOT OF THE TRANSYLVANIAN ALPS, PLOESTI DERIVED ITS NAME, "RAINY TOWN" IN ROMANIAN, FROM ITS FREQUENT SHOWERS. THE FIRST COMMERCIAL OIL WAS REFINED IN PLOESTI IN 1857, AND BY WWII THE CITY WAS PROCESSING 85% OF ROMANIAN OIL.<sup>7</sup> NOT SURPRISINGLY, PLOESTI CONTAINED EUROPE'S LARGEST OIL REFINERY, THE ASTRO ROMANA PLANT, PRODUCING TWO MILLION TONS OF OIL A YEAR.<sup>8</sup>

IN THE PACIFIC, AIR STRATEGISTS ZEROED-IN ON BALIKPAPAN. THE CITY OF BALIKPAPAN WAS LOCATED ON THE EAST COAST OF BORNEO IN THE NETHERLANDS EAST INDIES. THE OIL FACILITY HERE WAS THE LARGEST IN THE NETHERLANDS EAST INDIES AND THE SECOND LARGEST IN SOUTHEAST ASIA. WHILE THE FACILITY WAS OPERATED PRIMARILY BY DUTCH WORKERS, IT WAS BUILT BY THE US STANDARD OIL COMPANY, AND WAS THE "MOST COMPLETE OIL REFINERY OUTSIDE THE CONTINENTAL LIMITS OF UNITED STATES."<sup>9</sup> ALLIED INTELLIGENCE ESTIMATES DIFFERED ON THE AMOUNT OF OIL THE JAPANESE PRODUCED THERE, BUT THE HIGHEST CLAIMS STATED THAT THE REFINERIES HAD THE CAPACITY TO PRODUCE SEVEN MILLION BARRELS PER YEAR. BALIKPAPAN WAS LIKELY TO CATCH THE ATTENTION OF AMERICAN AIRMEN, SINCE THIS NEW FACILITY HAD THE CAPABILITY TO PRODUCE HIGH-OCTANE AVIATION GASOLINE.<sup>10</sup>

THESE TWO TARGETS SHARED MANY FEATURES. FIRST, AND MOST OBVIOUSLY, BOTH WERE OIL REFINING FACILITIES, WHICH THE AMERICANS VIEWED AS CRITICAL CHOKE POINTS BETWEEN THE RECOVERY OF RAW CRUDE AND THE USE OF PETROLEUM IN THE FIELD. WHILE BOTH TARGETS WERE TIGHTLY CONTROLLED BY THE GOVERNMENTS OF GERMANY AND JAPAN, THE FACILITIES WERE WELL OUTSIDE THEIR CONTIGUOUS BORDERS. THIS MEANT THAT THE REFINERIES WERE CONNECTED TO THEIR CUSTOMERS THROUGH LONG AND TENUOUS SUPPLY LINES – CONSISTING OF A RAIL AND DANUBE RIVER ROUTES FOR GERMANY AND OCEANIC SHIPPING ROUTES FOR JAPAN. ON THE OTHER HAND, BOTH TARGETS WERE WELL INSIDE OF THE ENEMY'S DEFENSIVE ZONES AND WERE STRONGLY PROTECTED BY INNER AND OUTER BANDS OF AIR AND GROUND-BASED DEFENSES. BECAUSE OF THIS, AMERICAN AIR

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<sup>6</sup> Overy, 228.

<sup>7</sup> Dugan, 8; Army Air Force Evaluation Board, 2.

<sup>8</sup> Dugan, 21.

<sup>9</sup> R. J. CONDON TO MINNEAPOLIS-HONEYWELL REGULATOR COMPANY, LETTER, SUBJECT: PLOESTI OF THE PACIFIC, 28 NOVEMBER 1944, FILE 730.309-5, AIR FORCE HISTORICAL RESEARCH AGENCY, MAXWELL AIR FORCE BASE, AL, 1.

<sup>10</sup> THE UNITED STATES STRATEGIC BOMBING SURVEY, MILITARY ANALYSIS DIVISION, "THE THIRTEENTH AIR FORCE IN THE WAR AGAINST JAPAN," 30 SEPTEMBER 1946, 12; AIR EVALUATION BOARD, S.W.P.A, REPORT NO. 5, *BALIKPAPAN RAIDS, 1944*, 10 JANUARY 1945, FILE 138.8-5, AIR FORCE HISTORICAL RESEARCH AGENCY, MAXWELL AIR FORCE BASE, AL, 7.

STRATEGISTS IN BOTH THEATERS NEEDED TO DEVISE UNIQUE ATTACK PLANS TO PLACE THE REFINERIES AT RISK.

IN DEVELOPING THESE PLANS, STRATEGISTS IN EUROPE AND THE PACIFIC WORKED INDEPENDENTLY AND DEALT WITH FORCE STRUCTURES, THREATS, AND TARGET CHARACTERISTICS SPECIFIC TO THEIR THEATERS. IN SPITE OF THIS, THE PLOESTI AND BALIKPAPAN OPERATIONS DEMONSTRATED STRIKING PARALLELS. IN BOTH CASES, THE REFINERY TARGETS ATTRACTED THE ATTENTION OF AIR OFFICERS AT THE VERY START OF THE WAR, RESULTING IN WEAK, UNSUCCESSFUL RAIDS. ONCE US FORCES ATTACKED IN EARNEST, BOTH OPERATIONS TURNED TO MAXIMUM-RANGE ATTACKS BY LARGE FORMATIONS OF UNESCORTED HEAVY BOMBERS. MEDITERRANEAN ALLIED AIR FORCES (MAAF) AND FAR EAST AIR FORCES (FEAF) LEADERS SOON STOPPED THIS STYLE OF ATTACK, AS THE HIGH LOSSES WERE UNSUSTAINABLE. ONCE THE AMERICANS RESUMED THE ATTACK, BOTH OFFENSIVES DEPENDED ON THE INNOVATIVE INTEGRATION OF FIGHTERS AND BOMBERS IN ORDER TO ACHIEVE TACTICAL AND OPERATIONAL OBJECTIVES.

NEVERTHELESS, THERE WERE SOME NOTABLE DIFFERENCES BETWEEN THE PLOESTI AND BALIKPAPAN OPERATIONS. THE MOST OBVIOUS OF THESE WAS THE LENGTH OF THE OPERATION. IN EUROPE, THE ALLIED AIR FORCES CONDUCTED CONCERTED OPERATIONS AGAINST PLOESTI FOR A YEAR, STARTING WITH A LOW-LEVEL ATTACK ON 1 AUGUST 1943 AND CULMINATING IN TWENTY RAIDS BETWEEN APRIL AND AUGUST 1944. IN THE PACIFIC, THE BALIKPAPAN ATTACKS CONSISTED OF ONLY FIVE RAIDS DURING SEPTEMBER AND OCTOBER 1944. IN PART, THIS WAS A RESULT OF COMPETING PRIORITIES IN THE PACIFIC THEATER; BUT, IT WAS ALSO A RESULT OF DELIBERATE DECISIONS RESULTING FROM EACH COMMAND'S OPERATIONAL PHILOSOPHY. MOREOVER, THE SCALE OF THE OPERATIONS IN EUROPE AND THE PACIFIC WERE DISSIMILAR. REFLECTING THE LARGE COMMITMENT OF AMERICAN AIR RESOURCES TO EUROPE, FIFTEENTH AIR FORCE SENT RAIDS CONSISTING OF AS MANY AS 604 BOMBERS AGAINST THE ROMANIAN REFINERIES.<sup>11</sup> FOR THE BALIKPAPAN ATTACKS, HOWEVER, THE LARGEST RAID FEAF COULD MUSTER WAS 104 B-24s.<sup>12</sup>

AS THEY PURSUED THEIR OPERATIONS, AMERICAN COMMANDERS OVERCAME SEEMINGLY INTRACTABLE TACTICAL PROBLEMS OF BOMBER RANGE, DEFENDING AGAINST FIGHTER ATTACK, AND BOMBING ACCURACY. THE RESULTS WERE THE SUBSTANTIAL DESTRUCTION OF BOTH FACILITIES, BUT WITH DIFFERING LEVELS OF COST. AGAINST PLOESTI, FIFTEENTH AIR FORCE QUICKLY OVERCAME THE RANGE PROBLEM WHEN ALLIED FORCES CAPTURED AIRFIELDS IN ITALY. HOWEVER, AXIS DEFENSES, BOTH ACTIVE AND PASSIVE, PLAGUED USSTAF UNTIL THE END. THE AMERICANS INTRODUCED A RANGE OF TACTICAL INNOVATIONS, YET THE SLOW PACE OF THESE INNOVATIONS ALLOWED THE GERMANS AND ROMANIANS TO EXTRACT A STEADY TOLL OF THE ATTACKING BOMBERS. FEAF FLEW ALL THE

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<sup>11</sup> *THE AIR BATTLE OF PLOESTI: WRITTEN IN THE SKIES OVER ROUMANIA BY THE U.S. FIFTEENTH AIR FORCE AND THE 205 GROUP (RAF) BETWEEN 5 APRIL AND 19 AUGUST 1944*, AIR ADJUTANT GENERAL, MAIL AND RECORDS DIVISION, UNCLASSIFIED RECORDS SECTION, RG 18, NATIONAL ARCHIVES AT COLLEGE PARK, COLLEGE PARK MD, 45.

<sup>12</sup> Air Evaluation Board, 83.

BALIKPAPAN STRIKES FROM MAXIMUM RANGE, AND FACED STRONG FIGHTER AND ANTI-AIRCRAFT DEFENSES SIMILAR TO THOSE AT PLOESTI. TO OVERCOME THESE DEFENSES, FEAF INTRODUCED A LARGE NUMBER OF TACTICAL INNOVATIONS HALF-WAY THROUGH THE OPERATION. THE EFFECTS WERE DRAMATIC, AS LOSS RATES PLUMMETED WHILE BOMBING ACCURACY SKYROCKETED. FEAF, LIKE USSTAF, ENDED THE OPERATION WITH THE TARGET A SHAMBLES.

ALTHOUGH FEAF DEMONSTRATED ITS SUPERIOR TACTICAL SKILL, THE PICTURE WAS MUCH DIFFERENT AT THE OPERATIONAL AND STRATEGIC LEVELS. BOTH THEATERS INITIALLY TARGETED THE REFINERIES IN ACCORDANCE WITH THE AIR CORPS TACTICAL SCHOOL'S INDUSTRIAL WEB THEORY, BUT THEN TURNED TO MORE IMMEDIATE OBJECTIVES DURING 1944. USSTAF'S OPERATION, BASED ON GOOD INTELLIGENCE INFORMATION, A SYSTEMIC ATTACK PLAN, AND REALISTIC OBJECTIVES, RESULTED IN A STRATEGIC CRISIS FOR GERMANY. FEAF'S OPERATION, IN CONTRAST, WAS GROUNDED ON INCOMPLETE INTELLIGENCE, A FAULTY OPERATIONAL CONCEPT, AND UNREALISTIC STRATEGIC OBJECTIVES. IN THE END, THE TREMENDOUS DESTRUCTION FEAF WROUGHT UPON THE BALIKPAPAN FACILITIES HAD LITTLE EFFECT ON THE JAPANESE WAR MACHINE.

A STUDY OF THE PLOESTI AND BALIKPAPAN OPERATIONS REVEALS TIMELESS LESSONS. FIRST, EDUCATION, UNIQUE EXPERIENCES, AND WELL-DEVELOPED RELATIONSHIPS ENABLED COMBAT LEADERS TO ACCOMPLISH COMPLEX AND UNEXPECTED TASKS. SECOND, INTELLIGENCE LOOMED LARGE IN EACH OPERATION, AND THE DIFFICULTIES AND PITFALLS OF ASSESSMENT HAD A DRAMATIC IMPACT ON HOW THEY PLAYED OUT. THIRD, THESE WWII OPERATIONS HIGHLIGHT THE IMPACT OF STRUCTURE AND ORGANIZATIONAL CULTURE ON A MILITARY UNIT'S ABILITY TO OPERATE AND PREVAIL IN BATTLE.

BEYOND THE DIRECT LESSONS FOR MILITARY LEADERS, THIS PAPER ENDEAVORS TO ADD TO THE BODY OF AIRPOWER HISTORY. HISTORIANS AND BIOGRAPHERS HAVE WRITTEN EXTENSIVELY ABOUT PLOESTI; BUT, MOST OF THIS LITERATURE HAS FOCUSED ON THE ATTACK OF 1 AUGUST 1943, IGNORING THE SIGNIFICANTLY LARGER 1944 OPERATIONS. AS FOR BALIKPAPAN, WRITERS HAVE HARDLY TOUCHED ON THE SUBJECT, DESPITE A COMPELLING STORY.

THIS PAPER WILL FIRST EXPLORE US OPERATIONS AGAINST PLOESTI FROM 1942 UNTIL THE CITY'S CAPTURE BY THE SOVIETS IN 1944. THE FIRST CHAPTER RECOUNTS INITIAL US ATTACKS AGAINST THE REFINERIES. THE SHOESTRING HALVERSON PROJECT MADE THE FIRST ATTEMPT AGAINST THE ROMANIAN REFINERIES IN 1942. OPERATIONS DID NOT START IN EARNEST, HOWEVER, UNTIL THE COSTLY TIDAL WAVE LOW-LEVEL ATTACK OF 1 AUGUST 1943. THIS OPERATION OBTAINED SOME OPERATIONAL EFFECT, BUT THE LOSSES VIRTUALLY DESTROYED IX BOMBER COMMAND. CHAPTER 2 PICKS UP THE STORY EIGHT MONTHS LATER AS FIFTEENTH AIR FORCE RETURNED TO MORE TRADITIONAL HIGH-ALTITUDE TACTICS WHEN IT CAMPAIGNED AGAINST PLOESTI. FROM APRIL TO AUGUST 1944, ALLIED FORCES SLOWLY REFINED THEIR MEDIUM ALTITUDE TACTICS, INFLECTING CUMULATIVE DAMAGE AGAINST

THE OIL FACILITIES. THESE RESULTS CAME AT A HEAVY PRICE, THOUGH, WITH THE ARMY AIR FORCE EVENTUALLY LOSING 286 BOMBERS IN ATTACKS AGAINST THE REFINERIES.<sup>13</sup>

THE NEXT TWO CHAPTERS OUTLINE THE AMERICAN EFFORT AGAINST BALIKPAPAN. CHAPTER 4 DESCRIBES THE INITIAL PLANNING AGAINST BALIKPAPAN AS WELL THE NIGHT ATTACK FLOWN FROM AUSTRALIA IN 1943. THE FOCUS OF THE CHAPTER, HOWEVER, IS ON THE ATTACKS OF 30 SEPTEMBER AND 3 OCTOBER 1944, WHEN JAPANESE DEFENSES MAULED UNESCORTED FEAF AIRCRAFT BOMBING FROM MEDIUM ALTITUDE. CHAPTER 5 RECOUNTS HOW FEAF REACTED TO THESE EVENTS. IN ONLY A WEEK, FEAF STRATEGISTS DIGESTED THE FIRST TWO RAIDS' PROBLEMS AND DEVELOPED RADICAL NEW SOLUTIONS TO DEAL WITH JAPANESE DEFENSES. BETWEEN 10 AND 18 OCTOBER, THREE ATTACKS SHOWCASED THESE NEW TACTICS, RESULTING IN WHOLESALE DAMAGE TO THE FACILITIES. UNFORTUNATELY, THIS DESTRUCTION DID NOT HAVE THE DRAMATIC EFFECT ON THE JAPANESE WAR EFFORT PREDICTED BY FEAF LEADERS.

THE LAST CHAPTER DRAWS LESSONS APPLICABLE IN THE TWENTY-FIRST CENTURY. INITIALLY, THE CHAPTER REVIEWS THE OPERATIONS, PLACING PERTINENT ASPECTS SIDE-BY-SIDE TO ILLUMINATE SIMILARITIES AND DIFFERENCES. THEN, THE CHAPTER DRAWS FROM THESE TO ANALYZE LEADERSHIP, THE USE OF INTELLIGENCE, AND THE INFLUENCE OF ORGANIZATIONAL STRUCTURE. FINALLY, THE CHAPTER EXAMINES TWO ISSUES THAT BOTH FEAF AND USSTAF STRUGGLED WITH THROUGHOUT THEIR OPERATIONS: DOCTRINAL BIAS AND COMBAT ASSESSMENT. THESE LESSONS POINT TO ATTRIBUTES THAT ANY COMBAT ORGANIZATION CAN NURTURE TO IMPROVE ITS CHANCES FOR SUCCESS.

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<sup>13</sup> Army Air Force Evaluation Board, Appendix D, 1-5.

## CHAPTER 1

### PLOESTI – THE CAULDRON

*COMING BACK IS SECONDARY TODAY.*

A NINTH AIR FORCE B-24 PILOT UTTERED THESE WORDS AS HE PREPARED TO DEPART ON THE LOW-LEVEL ATTACK AGAINST PLOESTI. THE QUOTE ACCURATELY REFLECTED THE ATTITUDE UP AND DOWN THE AAF CHAIN CONCERNING THIS VITAL TARGET. AS ALLIED FORCES PREPARED TO ENTER GERMAN-OCCUPIED EUROPE, OIL SEEMED THE KEY TO UNHINGING THE WERMACHT'S MECHANIZED BLITZKRIEG TACTICS. FURTHER, US ARMY AIR CORPS PRE-WAR THEORY PREDICTED OIL WOULD BE A CRITICAL ELEMENT OF ANY MODERN INDUSTRY. NATURALLY, THEREFORE, PLOESTI CAPTURED THE EARLY ATTENTION OF AIR STRATEGISTS. THIS LARGE, EASILY-IDENTIFIED, VULNERABLE TARGET APPEARED TO BE THE IDEAL MATCH FOR THE AAF, DEVELOPED, TRAINED, AND EQUIPPED AS IT WAS FOR LONG-RANGE STRATEGIC BOMBARDMENT. GIVEN ALL OF THIS, AMERICAN AIR STRATEGISTS WERE WILLING TO ACCEPT A HIGH-RISK PLAN IN THE HOPES OF A WAR-WINNING PAY-OFF. IN FACT, AMERICAN AIRMEN VIEWED THIS OPERATION AS SO IMPORTANT THAT THE AIR STAFF IN WASHINGTON D.C. CONTROLLED MUCH OF THE PLANNING AND FORCE STRUCTURE DEVELOPMENT. ONCE THE AIR STAFF DELEGATED THE TASK TO THE FIELD, THE PLANNERS TRAINED AND BRIEFED THE CREWS TO A LEVEL OF DETAIL RARELY SEEN BEFORE. THE RESULTING LOW-ALTITUDE ATTACK CAME WITH TREMENDOUS COSTS BUT ONLY PARTIALLY ACHIEVED ITS OPERATIONAL OBJECTIVES. AT THIS POINT, AIR LEADERS REALIZED THAT THEIR GAMBLE NOT ONLY COSTS THE LIVES OF THEIR CREWS, BUT ALSO TOOK AWAY ANY NEAR-TERM OPPORTUNITY TO RE-ATTACK.

### STRATEGIC SITUATION, PLOESTI AS A TARGET, AND AXIS DEFENSES

THE WAR IN EUROPE HUNG IN THE BALANCE BETWEEN 1942 AND THE SUMMER OF 1943. WHILE THE ALLIES GAINED THE UPPER HAND OVER GERMANY IN SEVERAL RESPECTS, HITLER STILL COMMANDED A POTENT AND BY NO MEANS PROSTRATE FORCE. ALLIED ADVANCES DID, HOWEVER, BRING AMERICAN BOMBERS WITHIN RANGE OF THE GREAT PRIZE OF PLOESTI. THE ROMANIAN REFINERIES PROVIDED A CONSIDERABLE AMOUNT OF THE FUEL FOR THE GERMAN WAR MACHINE, ALTHOUGH AMERICAN AIR STRATEGISTS OVERESTIMATED THE UTILITY OF THIS OIL TO GERMANY'S ECONOMY. GERMANY RECOGNIZED THE IMPORTANCE OF THE REFINERIES, GUARDING THEM WITH AN AIR DEFENSE SYSTEM RIVALED ONLY BY THAT IN GERMANY ITSELF.

AMERICAN FORCES HELPED THE ALLIES TRANSITION TO THE OFFENSE DURING THE YEAR AND A HALF FOLLOWING PEARL HARBOR. PRIOR TO THE AMERICAN ENTRY, THE BRITISH HAD STABILIZED THEIR POSITION, BUT HAD ONLY LIMITED OPPORTUNITIES TO ASSUME THE OFFENSIVE. THE MAIN BRITISH

ACTIVITIES IN DECEMBER 1941 WERE THE INCREASING CRESCENDO OF CITY ATTACKS BY BOMBER COMMAND AND THE EXCHANGE OF BLOWS BETWEEN ROMMEL'S AFRIKA KORPS AND THE BRITISH ARMY. IMPLEMENTING A "EUROPE FIRST" STRATEGY, THE BULK OF AMERICA'S RESOURCES FLOWED ACROSS THE ATLANTIC. UNABLE TO CONVINCE THE BRITISH TO CONDUCT AN EARLY CROSS-CHANNEL LANDING, AMERICAN LEADERS ACCEPTED A COMPROMISE. THIS CONSISTED OF THE DEFEAT OF GERMAN AND ITALIAN FORCES IN NORTH AFRICA STARTING IN 1942 AND THE RE-ENTRY OF EUROPE WITH THE INVASION OF SICILY IN THE SUMMER OF 1943. THESE LAND OPERATIONS OFFERED NEW BASES FROM WHICH USAAF UNITS JOINED THE EMBRYONIC STRATEGIC AIR OFFENSIVE AGAINST THE AXIS POWERS.

GERMANY, IN CONTRAST, HAD MOVED TO THE DEFENSIVE ON NEARLY EVERY FRONT BY THE SUMMER OF 1943. THE LOSS OF NORTH AFRICA QUELLED AXIS AMBITIONS TO CONTROL THE SUEZ CANAL AND MIDDLE EAST OIL, BUT DID NOT CAUSE IRREPARABLE STRATEGIC DAMAGE. THE LARGER CONCERN WAS THE LOOMING INVASION TO ONE OF THE FOUNDING AXIS POWERS, ITALY. THE 1942 EASTERN OFFENSIVE HAD FAILED AT STALINGRAD, AND THE APPROACHING BATTLE OF KURSK WOULD END GERMAN HOPES OF REGAINING THE INITIATIVE IN RUSSIA. THE SCALE OF ALLIED AIR ATTACKS WAS INCREASING, WITH BOTH BRITISH AND AMERICAN AIRCRAFT PENETRATING TO THE GERMAN HEARTLAND. THE BATTLE OF THE ATLANTIC REACHED A CRESCENDO FROM JANUARY TO MAY OF 1943, RESULTING IN THE TEMPORARY WITHDRAWAL OF U-BOATS FROM THE CONFLICT. IN SPITE OF ALL OF THIS, GERMANY STILL RETAINED CONSIDERABLE FIGHT. THE WERMACHT WAS SKILLED AND BATTLE-HARDENED, GERMAN INDUSTRY WAS EXPANDING, AND HITLER CONTROLLED THE BULK OF EUROPEAN TERRITORY.

PLOESTI PROVIDED ESSENTIAL SERVICES TO THE GERMAN WAR MACHINE. CRUDE OIL SERVICED TWO-THIRDS OF GERMANY'S PETROLEUM NEEDS, AND ROMANIA CONTAINED 64.5 % OF AXIS CRUDE PRODUCTION.<sup>14</sup> THE MOST IMPORTANT CONSUMER OF PLOESTI'S OIL WAS THE GERMAN MILITARY, AS THE REFINERIES PRODUCED ONE-THIRD OF GERMANY'S HIGH-OCTANE AVIATION GASOLINE, PANZER FUEL, BENZENE, AND LUBRICANTS.<sup>15</sup> WHILE GERMANY'S MILITARY DEPENDED ON ROMANIAN OIL, HER INDUSTRY DID NOT. GERMANY'S ECONOMY WAS COAL-BASED: GERMAN FACTORIES AND ELECTRICAL PLANTS WERE POWERED BY COAL, AND HER GOODS WERE TRANSPORTED PRIMARILY BY COAL-POWERED LOCOMOTIVES.<sup>16</sup> BE THAT AS IT MAY, HITLER'S CONCERN FOR PROTECTING THE ROMANIAN REFINERIES PROMPTED HIM TO ORDER THE CAPTURE OF BRITISH BOMBER BASES IN THE MEDITERRANEAN, INCLUDING CRETE, EARLY IN THE WAR.<sup>17</sup>

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<sup>14</sup> Stephen E. Ambrose, *The Wild Blue: The Men and Boys Who Flew the B-24s over Germany 1944-45* (New York: Touchstone Books, 2001), 113; Army Air Force Evaluation Board, 2.

<sup>15</sup> Dugan and Stewart, 8.

<sup>16</sup> Alfred C. Mierzejewski, *The Collapse of the German War Economy, 1944-1945: Allied Air Power and the German National Railway* (Chapel Hill, NC: University of North Carolina Press, 1988), 181.

<sup>17</sup> CAJUS BEKKER, *THE LUFTWAFFE WAR DIARIES*, TRANSLATED AND EDITED BY FRANK ZEIGLER (NEW YORK: BALLANTINE BOOKS, 1969), 259.



FIGURE 1. THE MEDITERRANEAN BASIN

SOURCE: [HTTP://WWW.NATIONMASTER.COM/ENCYCLOPEDIA/MEDITERRANEAN-SEA](http://www.nationmaster.com/encyclopedia/Mediterranean-Sea)

THE PLOESTI REFINERIES PRESENTED A DIFFICULT SET OF TARGETS. THE COMPLEX CONSISTED OF FIVE MAJOR AND SEVEN MINOR REFINERIES IN A THREE-MILE RING AROUND THE CITY. IN ADDITION TO THESE, THE ROMANIANS OPERATED REFINERY FACILITIES EIGHTEEN MILES NORTH AND FIVE MILES SOUTH OF PLOESTI PROPER. EACH REFINERY WAS SPREAD OUT OVER AS MUCH AS A SQUARE MILE, WITH VOLATILE PROCESSING UNITS DISPERSED WITHIN THE FACILITIES TO PREVENT THE SPREAD OF FIRE. BECAUSE OF THIS, AIR ATTACKS NEEDED TO STRIKE CRITICAL AIM POINTS, SUCH AS THE POWERHOUSE, THE BOILER HOUSE, STILLs, CRACKING TOWERS, AND PUMPING STATIONS. THE ROMANIANS PROTECTED THESE IMPORTANT COMPONENTS FROM AIR ATTACK WITH BLAST WALLS. FINALLY, THE GERMANS INSISTED ON LINKING THE DIFFERENT REFINERIES WITH A TRUNK PIPELINE. THIS PIPELINE ENSURED THAT THE REFINERY SYSTEM WOULD CONTINUE TO OPERATE EVEN IF ATTACKS DAMAGED SOME INDIVIDUAL REFINERIES.<sup>18</sup> THE PLOESTI REFINERIES DISTRIBUTED OIL THROUGH A NETWORK OF RAIL LINES CONNECTING TO THE REST OF EUROPE AND PIPELINES CONNECTED TO THE BLACK SEA PORT OF CONSTANZA AND THE DANUBE PORTS OF GIURGIU AND VARCIOROVA.<sup>19</sup>

<sup>18</sup> Dugan and Stewart, 32-36.

<sup>19</sup> Army Air Force Evaluation Board, 6.



TO THEIR DESIGNED BOMB RESISTANCE, GERMAN GENERAL ALFRED GERNSTENBERG ADDED A FORMIDABLE AIR DEFENSE SYSTEM. THE LUFTWAFFE ESTABLISHED AN OUTER DEFENSIVE RING CONSISTING OF BULGARIAN AND GERMAN FIGHTERS TO STOP ALLIED AIR ATTACKS LONG BEFORE THEY REACHED ROMANIA. ANY BOMBERS PENETRATING INTO CENTRAL ROMANIA WOULD MEET AN INNER FIGHTER RING CONSISTING OF *JAEGERGRUPPE 4*'S FIFTY-TWO ME-109S AT MIZIL, *NACHTJAEGERGRUPPE 6*'S SEVENTEEN ME-110S AT ZILISTEA, TWENTY ROMANIAN IAR-80S AND IAR-81S AT BUCHAREST, AS WELL AS JU-88S AND OTHER LESS SUITED AIRCRAFT.<sup>20</sup>

GERSTENBERG ALSO ORGANIZED STRONG GROUND-BASED DEFENSES TO DEAL WITH ANY BOMBERS THAT REACHED THE REFINERIES. THIS STARTED WITH PASSIVE DEFENSES, WITH THE GERMANS CONSTRUCTING A FAKE TARGET COMPLEX TEN MILES WEST OF PLOESTI. MORE SUBSTANTIALLY, THE GERMANS RINGED THE REFINERIES WITH FORTY 88MM BATTERIES CONSISTING OF 237 GUNS. GERMAN TROOPS MANNED EIGHTY PERCENT OF THESE WEAPONS, ALTHOUGH MANY UNITS USED RUSSIAN PRISONERS AS AMMUNITION BEARERS. THE GERMANS ALSO POSTED SMALLER-CALIBER WEAPONS THROUGHOUT THE TARGET AREA, SERVED MAINLY BY AUSTRIAN AND ROMANIAN TROOPS. FINALLY, THE GERMANS EMPLOYED A MOBILE FLAK TRAIN THAT THEY COULD QUICKLY DEPLOY TO ANY EXPECTED LOW-LEVEL ROUTE. THE GERMANS REGULARLY EXERCISED THESE ANTI-AIRCRAFT DEFENSES USING HE-111S AND JU-52S AS UNANNOUNCED MOCK RAIDERS.<sup>21</sup>

THE GERMANS TIED THE AIR AND GROUND DEFENSES TOGETHER WITH AN EXTENSIVE COMMAND AND CONTROL SYSTEM. THE ALLIED FLIGHT ROUTE FROM NORTH AFRICA TO ROMANIA CROSSED SIX GERMAN AIR DEFENSE ZONES. PLOESTI RESIDED IN ZONE 24 EAST, WHICH WAS CONTROLLED BY THE LUFTWAFFE FIGHTER COMMAND AT OTOPENII. THE OTOPENII COMMAND CENTER CONSISTED OF A TWO-STORY, CAMOUFLAGED HEADQUARTERS CONTAINING A PLOTTING BOARD AND COMMUNICATIONS LINKS TO WURTZBURG RADAR STATIONS, AN AIR OBSERVER NETWORK, INTERCEPTOR AIRFIELDS, ANTI-AIRCRAFT UNITS, AND AIR RAID WARNING AUTHORITIES. THE SENIOR CONTROLLER FOR ZONE 24 EAST WAS COLONEL BERNHARD WOLDENGA, AN EXPERIENCED AIRMAN PREVIOUSLY RESPONSIBLE FOR DIRECTING DEFENSES AGAINST NINTH AIR FORCE BOMBERS IN NORTH AFRICA.<sup>22</sup>

ANY AMERICAN ATTACK AGAINST THE PLOESTI COMPLEX WOULD BE A DAUNTING TASK. THE GERMANS WERE WELL OF AWARE OF THE VALUE OF THE REFINERIES, WHICH HAD BECOME EVEN MORE IMPORTANT AS OTHER ATTEMPTS TO SEIZE FOREIGN OIL HAD FAILED. THE GERMANS WERE ALSO AWARE OF PLOESTI'S VULNERABILITY. IN 1943, ALLIED AIR ATTACKS ON GERMANY CREATED SIGNIFICANT PRESSURE TO CONSOLIDATE AXIS AIR DEFENSES IN HOMELAND DEFENSE, BUT THE LUFTWAFFE MAINTAINED A SIZABLE FORCE TO SHIELD THEIR ROMANIAN BLACK GOLD.

#### NINTH AIR FORCE AIR FORCES – EARLY OPERATIONS, LEADERSHIP, AND FORCE STRUCTURE

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<sup>20</sup> Dugan and Stewart, 23-24, 69-81.

<sup>21</sup> Dugan and Stewart, 10, 26, 32, 75, 143-144.

<sup>22</sup> Dugan and Stewart, 31, 86-88.

THE AAF CALLED ON NINTH AIR FORCE TO STRIKE THE PLOESTI COMPLEX. THE AAF ORIGINALLY DESIGNED NINTH AIR FORCE TO SUPPORT LAND OPERATIONS IN NORTH AFRICA. AS THE NORTH AFRICAN CAMPAIGN CAME TO A CLOSE, HOWEVER, THE AIR STAFF PROVIDED THE ADDITIONAL FORCE STRUCTURE AND LEADERSHIP TO ENABLE THIS ORGANIZATION TO EXECUTE STRATEGIC ATTACKS AGAINST ROMANIA.

ONE OF NINTH AIR FORCE'S PRECURSOR UNITS CONDUCTED THE AAF'S FIRST ATTEMPT AT PLOESTI, IN WHAT WAS ALSO THE FIRST ATTACK BY US BOMBERS AGAINST THE CONTINENT OF EUROPE. THIS RAID WAS AN OUTGROWTH OF THE HASTILY ASSEMBLED HALVERSON PROJECT NO. 63 (OR HALPRO, FOR SHORT), WHICH DEPARTED FROM THE US IN THE SPRING OF 1942. COLONEL HARRY A. HALVERSON LED TWENTY-THREE B-24Ds ACROSS AFRICA EN-ROUTE TO CHINA FROM WHICH THEY WERE TO STRIKE JAPAN.<sup>23</sup> THE AIR STAFF HALTED THE BOMBERS IN EGYPT, HOWEVER, ONCE PLANNERS LEARNED THAT THE JAPANESE HAD OVERRUN FORWARD AIRFIELDS AROUND CHEKAING. WITH NO OTHER ASSIGNED MISSION, GENERAL ARNOLD ORDERED A STRIKE AGAINST PLOESTI. THE BRITISH PROVIDED THE PLAN, ON WHICH THEY HAD BEEN WORKING FOR TWO YEARS, CALLING FOR A NIGHT FLIGHT TO THE TARGET, FOLLOWED BY A FORMATION RENDEZVOUS AND BOMB RUN AT FIRST LIGHT. TO SAVE FUEL, HALVERSON'S CREWS MODIFIED THE PROPOSED ROUTING BY PLOTTING A COURSE THROUGH NEUTRAL TURKEY'S AIRSPACE. THIRTEEN OF HALVERSON'S BOMBERS TOOK OFF ON INDIVIDUAL COURSES FROM FAYID, IN THE SINAI DESERT, LATE ON THE NIGHT OF 11 JUNE 1942.<sup>24</sup>

TWELVE OF THE BOMBERS MADE IT TO THE TARGET AREA, BUT FOUND THE REFINERIES OBSCURED BY CLOUDS AND GROUND REFERENCES ALTERED BY FLOODS. SO, THE BOMBERS DROPPED TWENTY-FOUR TONS OF BOMBS BASED ON DEAD-RECKONING CALCULATIONS AND TURNED FOR HOME.<sup>25</sup> AT LEAST ONE BOMBER WAS ATTACKED BY FIGHTERS, RESULTING IN THE FIRST AMERICAN WOUNDED BOMBER CREWMAN OVER EUROPE. THE AMERICANS WERE SUPPOSED TO RECOVER AT HABBANIYEH, IRAQ, BUT FUEL SHORTAGES, NAVIGATION DIFFICULTIES, AND BATTLE DAMAGE SPREAD THEM ACROSS THE MIDDLE EAST. SEVEN AIRCRAFT LANDED AT VARIOUS IRAQI LOCATIONS, TWO LANDED AT ALEPPO, SYRIA, FOUR LANDED IN TURKEY, AND ONE CRASHED.<sup>26</sup> THE B-24S THAT LANDED IN TURKEY WERE INTERRED, AS WAS A FUEL-HUNGRY ME-109 THAT LANDED AFTER CHASING THE BOMBERS FROM

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<sup>23</sup> WESLEY FRANK CRAVEN AND JAMES LEA CRATE, EDS., *THE ARMY AIR FORCES IN WORLD WAR II*. VOL. 1: *PLANS AND EARLY OPERATIONS JANUARY 1939 TO AUGUST 1941* (WASHINGTON, D.C.: OFFICE OF AIR FORCE HISTORY, 1983), 341-342; IN AN INTERESTING CONNECTION TO THE LATER HALF OF THIS STORY, HALVERSON WAS CLOSELY CONNECTED TO CARL SPAATZ, SERVING AS A CREW MEMBER ON THE 1929 RECORD-SETTING FLIGHT OF THE *QUESTION MARK* AND LATER SERVING AS SPAATZ'S DEPUTY DURING HIS TENURE AS THE CHIEF OF OPERATIONS AND TRAINING FOR THE AIR STAFF IN THE MID 1930S. FOR A DISCUSSION OF THIS, SEE DEWITT S. COPP, *A FEW GREAT CAPTAINS: THE MEN AND EVENTS THAT SHAPED THE DEVELOPMENT OF AMERICAN AIR POWER* (MCLEAN, VA: EPM PUBLICATIONS, INC., 1980), 85-86, 313.

<sup>24</sup> WESLEY FRANK CRAVEN AND JAMES LEA CRATE, EDS., *THE ARMY AIR FORCES IN WORLD WAR II*. VOL. 2: *EUROPE: TORCH TO POINTBLANK AUGUST 1942 TO DECEMBER 1943* (WASHINGTON, D.C.: OFFICE OF AIR FORCE HISTORY, 1983), 10; DUGAN AND STEWART, 3-13.

<sup>25</sup> Army Air Force Evaluation Board, 7.

<sup>26</sup> Craven and Cate, vol. 2, 10.

ROMANIA. NOT SURPRISINGLY, THE ROMANIANS RECORDED NO DAMAGE TO THE OIL FACILITIES AND DID NOT EVEN NOTE AN AIR RAID ON THIS DATE.<sup>27</sup> THE US FAILED TO PUBLICIZE THE RAID, LEADING TO THE PREVALENT MISPERCEPTION THAT BOMBERS FROM ENGLAND CARRIED OUT THE FIRST AMERICAN ATTACKS ON THE CONTINENT.<sup>28</sup> IN A FITTING EPITAPH, EISENHOWER LATER STATED THAT "THE HALVERSON PROJECT...DID SOMETHING TO DISPEL THE ILLUSION THAT A FEW BIG PLANES COULD WIN THE WAR."<sup>29</sup>

WHEN THE AAF TURNED A SERIOUS EYE TOWARD PLOESTI THE FOLLOWING YEAR, IT DIRECTED NINTH AIR FORCE TO CONDUCT THE ATTACKS. NINTH AIR FORCE WAS AN ODD ORGANIZATION FROM THE VERY BEGINNING. IT WAS ORIGINALLY FORMED AS US ARMY - MIDDLE EAST AIR FORCE (USMEAF) IN JUNE 1942 FROM A CONGLOMERATION OF THE REMAINING HALPRO BOMBERS, TWELVE TIRED B-17S FROM THE PACIFIC, AND A GROUP OF P-40S DELIVERED BY THE *USS RANGER* DURING THE TORCH LANDINGS. RE-DESIGNATED NINTH AIR FORCE IN NOVEMBER, THE ORGANIZATION REMAINED SMALL, CONSISTING OF ONLY THREE FIGHTER GROUPS, TWO MEDIUM BOMBER GROUPS, AND TWO HEAVY BOMBER GROUPS. IT WAS THE AMERICAN COMPONENT TO THE ROYAL AIR FORCE, MIDDLE EAST (RAFME). RAFME WAS, IN TURN, ONE OF THE THREE COMPONENTS OF THE MEDITERRANEAN AIR COMMAND (MAC). THE OTHER COMPONENTS OF MAC WERE RAF, MALTA AND THE PREDOMINATELY AMERICAN NORTHWEST AFRICAN AIR FORCES (NAAF) COMMANDED BY GENERAL CARL SPAATZ. RAFME AND NINTH AIR FORCE SUPPORTED THE BRITISH LAND PUSH FROM EGYPT, WHILE THE BULK OF AMERICAN AIR FORCES SUPPORTED THE ALLIED DRIVE FROM THE TORCH LANDINGS TO THE WEST. AS THE TWO OPERATIONS DREW TOGETHER, NAAF ASSUMED OPERATIONAL CONTROL OF NINTH AIR FORCE'S FIGHTER, MEDIUM BOMBARDMENT, AND TROOP CARRIER GROUPS. THIS LEFT NINTH AIR FORCE IN OPERATIONAL CONTROL OF ONLY ITS TWO B-24 GROUPS.<sup>30</sup>

MAJOR GENERAL LEWIS BRERETON COMMANDED NINTH AIR FORCE DURING ITS OPERATIONS IN THE MEDITERRANEAN. BRERETON HAD GRADUATED FROM THE US NAVAL ACADEMY, BUT THEN RESIGNED TO ACCEPT A COMMISSION IN THE ARMY'S COAST ARTILLERY CORPS IN 1911. BRERETON TRANSFERRED TO AVIATION IN WORLD WAR I, COMMANDING TWO SQUADRONS BEFORE BECOMING CHIEF OF AVIATION FOR I ARMY CORPS. BETWEEN THE WARS, HE SERVED BRIEFLY ON THE FACULTY AT THE AIR CORPS TACTICAL SCHOOL (1924-1925) AND THEN ATTENDED THE COMMAND AND GENERAL STAFF COLLEGE.<sup>31</sup> AFTER GRADUATION FROM CGSC, BRERETON SERVED IN VARIOUS FIELD COMMANDS, DURING WHICH HE EARNED A REPUTATION AS "A DEBONAIR TYPE AND...NOT TOO SERIOUS A PRACTITIONER OF AIR POWER."<sup>32</sup> HE RETURNED TO LEAVENWORTH AS AN INSTRUCTOR FROM 1935

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<sup>27</sup> Army Air Force Evaluation Board, 7.

<sup>28</sup> Dugan and Stewart, 12-14.

<sup>29</sup> DWIGHT D. EISENHOWER, *CRUSADE IN EUROPE* (GARDEN CITY, NY: DOUBLEDAY & COMPANY, INC., 1948), 161.

<sup>30</sup> Craven and Cate, vol. 2, 416-418.

<sup>31</sup> ROBERT T. FINNEY, *HISTORY OF THE AIR CORPS TACTICAL SCHOOL 1920-1940*. (WASHINGTON, D.C.: AIR FORCE HISTORY AND MUSEUMS PROGRAM, 1998), 100.

<sup>32</sup> COPP, 274.

UNTIL 1939. THE AAF PROMOTED HIM QUICKLY DURING THE INITIAL STAGES OF THE WAR, ASSIGNING HIM COMMAND OF THE 17<sup>TH</sup> BOMB WING, THIRD AIR FORCE, FAR EAST AIR FORCE, ALLIED AIR FORCES FAR EAST, AND TENTH AIR FORCE IN INDIA BEFORE ARRIVING IN THE MIDDLE EAST.<sup>33</sup> HIS COMBAT PERFORMANCE IN THESE EARLY ASSIGNMENTS WAS ANYTHING BUT GLORIOUS, AS HE WAS BEST KNOWN FOR HAVING MOST OF HIS FAR EAST AIR FORCE DESTROYED ON THE GROUND AT CLARK FIELD ON THE OPENING DAY OF THE PACIFIC WAR.

BRERETON'S CHIEF SUBORDINATE FOR THE PLOESTI MISSION WAS THE COMMANDER OF THE IX BOMBER COMMAND, BRIGADIER GENERAL UZAL ENT. ENT WAS COMMISSIONED IN THE AIR SERVICE AFTER GRADUATION FROM WEST POINT IN 1924. ORIGINALLY QUALIFIED AS A BALLOON PILOT, ENT TRANSITIONED TO HEAVIER-THAN-AIR AIRCRAFT AND THEN, IN 1937, GRADUATED FROM THE AIR CORPS TACTICAL SCHOOL. ENT SPENT THE FOLLOWING YEAR AS A STUDENT AT LEAVENWORTH, UNDOUBTEDLY INTERACTING WITH CGSC INSTRUCTOR BRERETON. ENT SERVED AS THE MILITARY ATTACHÉ IN LIMA, PERU FROM THE BEGINNING OF THE WAR UNTIL 1942. HE ASSUMED COMMAND OF IX BOMBER COMMAND IN 1943, FLYING A TOTAL OF FIVE COMBAT SORTIES DURING THAT YEAR. ALTHOUGH ENT WENT ON TO COMMAND SECOND AIR FORCE AFTER THE PLOESTI MISSION, IX BOMBER COMMAND WAS TO BE HIS ONLY COMMAND IN AN ACTIVE THEATER.<sup>34</sup>

ENT'S COMMAND CONSOLIDATED AROUND BENGHAZI AND EXPANDED JUST FOR THE PLOESTI MISSION. ENT NORMALLY CONTROLLED TWO B-25 GROUPS, WHICH DID NOT HAVE THE RANGE TO ATTACK PLOESTI, AND TWO B-24 HEAVY BOMBER GROUPS. THE FIRST OF THESE WAS THE 376TH BOMB GROUP, THE LIBERANDOS, BUILT AROUND THE HALPRO REMNANTS AND COMMANDED BY COLONEL K.K. COMPTON. THE OTHER PERMANENT NINTH AIR FORCE B-24 UNIT WAS THE 98TH BOMB GROUP, THE PYRAMIDERS, COMMANDED BY COLONEL JOHN "KILLER" KANE. TO THIS FORCE, EIGHT AIR FORCE TEMPORARILY ATTACHED THREE MORE B-24 GROUPS: THE 93RD BOMB GROUP (THE TRAVELING CIRCUS), COMMANDED BY COLONEL ADDISON BAKER; THE 44TH BOMB GROUP (THE EIGHT BALLS), COMMANDED BY COLONEL LEON JOHNSON, AND THE 389TH BOMB GROUP (THE SKY SCORPIONS), COMMANDED BY COLONEL JACK WOOD. EACH GROUP CONSISTED OF FOUR SQUADRONS, NORMALLY EQUIPPED WITH SIX AIRCRAFT EACH.<sup>35</sup>

THE MIX OF DIFFERENT CAMOUFLAGE PAINT AMONG THE FIVE GROUPS REFLECTED THE DISSIMILARITY OF THEIR COMBAT EXPERIENCE AND TACTICAL SKILLS. THE TWO NINTH AIR FORCE GROUPS FLEW WEARY TAN-COLORED BOMBERS THAT SOMETIMES LACKED OXYGEN SYSTEMS. THESE CREWS HAD BOMBED SHIPPING, HARBOR INSTALLATIONS, AND SUPPLY LINES IN SUPPORT OF THE DESERT OFFENSIVES. OPERATING AGAINST THE DIMINISHED NORTH AFRICAN THREAT, THE LIBERANDOS AND

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<sup>33</sup> R. MANNING ANCELL WITH CHRISTINE M. MILLER, *THE BIOGRAPHICAL DICTIONARY OF WORLD WAR II GENERALS AND FLAG OFFICERS: THE U.S. ARMED FORCES* (WESTPORT, CT: GREENWOOD PRESS, 1996), 370-371.

<sup>34</sup> Ancell with Miller, 387; Way and Sternfels, 33.

<sup>35</sup> Dugan and Stewart, 42; AAF: *The Official Guide to the Army Air Forces* (New York: Pocket Books, Inc., 1944), 319; Ambrose, 113; "Army Air Force Unit Database," n.p., online, Internet, 1 February 2005, available from <http://www.armyairforces.com>.

PYRAMIDERS WERE ACCUSTOMED TO SMALLER MISSIONS, LOOSE FORMATION FLYING, AND MEDIUM ALTITUDE ATTACKS. THE EIGHTH AIR FORCE GROUPS, ON THE OTHER HAND, FLEW GREEN CAMOUFLAGED BOMBERS THAT HAD ATTACKED SUBMARINE PENS, HARBORS, AND INDUSTRY IN GERMANY AND THE OCCUPIED COUNTRIES. AS SUCH, THEY WERE WELL-PRACTICED IN HIGH-ALTITUDE ATTACKS AND TIGHT FORMATIONS. THE 389<sup>TH</sup> BOMB GROUP, IN THEIR NEW BARE-METAL B-24s, HAD BEEN DIVERTED TO NORTH AFRICA WHILE EN-ROUTE TO THE UNITED KINGDOM, AND THUS HAD NO COMBAT EXPERIENCE.<sup>36</sup>

#### DOCTRINAL UNDERPINNING, ADVANCED PLANNING, AND PREPARATION

LONG BEFORE THE BOMB GROUPS ASSEMBLED IN NORTH AFRICA, PLANNERS AND LOGISTICIANS HAD BEEN HARD AT WORK PREPARING FOR A STRIKE AGAINST PLOESTI. AIR CORPS DOCTRINAL THINKERS AT MAXWELL FIELD LAID THE SEEDS FOR THE STRIKE YEARS BEFORE THE ATTACK ON PEARL HARBOR. BY THE MIDDLE OF WWII, SENIOR POLITICAL, ARMY, AND AAF LEADERS ALL ADVOCATED A REFINERY ATTACK IN ACCORDANCE WITH THE AAF'S PREWAR DOCTRINE. WITH THIS HIGH-LEVEL INVOLVEMENT, THE AIR STAFF IN WASHINGTON D.C. ACCOMPLISHED MUCH OF THE PLOESTI PLANNING, LEAVING FIELD COMMANDERS TO EXECUTE A DIFFICULT OPERATION THEY DID NOT CONCEIVE. WHILE THE AIR OFFICERS FINISHED THE PLANNING, A LOGISTICAL EFFORT UNPRECEDENTED FOR MEDITERRANEAN AIR FORCES PREPARED THE BOMBERS TO DO BATTLE.

THE INDUSTRIAL WEB THEORY OF THE AIR CORPS TACTICAL SCHOOL (ACTS) PROVIDED THE DOCTRINAL UNDERPINNING FOR THIS HIGH-RISK VENTURE. ACTS WAS THE AAF'S BRANCH SCHOOL THAT TAUGHT COMPETITIVELY-SELECTED, MID-LEVEL AIR OFFICERS THE THEORY AND PLANNING OF AIRPOWER. ACTS AUTHORED QUASI-OFFICIAL AIR DOCTRINE, AND, MORE IMPORTANTLY, INDOCTRINATED THE CREAM OF THE AIR CORPS, AS 80% OF WWII AAF GENERAL OFFICERS WERE GRADUATES. THE PRIMARY DOCTRINAL PRODUCT OF ACTS WAS THE INDUSTRIAL WEB THEORY. REFINED FROM BILLY MITCHELL'S CONCEPTS, THIS THEORY CLAIMED THAT MODERN POWERS RELIED ON INDUSTRIAL AND ECONOMIC SYSTEMS TO WAGE WAR, THE DESTRUCTION OF WHICH WOULD FATALLY UNDERMINE THE ENEMY'S ABILITY AND WILL TO FIGHT. COLLAPSING THESE SYSTEMS DEPENDED ON FINDING VULNERABLE CRITICAL POINTS. ACTS CLAIMED THAT HIGH-ALTITUDE BOMBERS COULD PENETRATE ENEMY DEFENSES AND ACCURATELY STRIKE THESE VITAL AIM POINTS.<sup>37</sup>

OIL PRODUCTION HAD A CENTRAL PLACE IN THIS CONCEPT. ACTS TAUGHT THAT THE AIR STRATEGISTS COULD REAP MAXIMUM BENEFITS BY ATTACKING "NATIONAL ORGANIC SYSTEMS ON WHICH MANY FACTORIES AND NUMEROUS PEOPLE DEPENDED." THE INDUSTRIAL WEB THEORY LISTED SIX OF THESE ORGANIC SYSTEMS, THE TOP THREE OF WHICH WERE ELECTRICAL POWER GENERATION AND

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<sup>36</sup> Craven and Cate, vol. 2, 478.

<sup>37</sup> Lt. Col. Peter R. Faber, "Interwar US Army Aviation and the Air Corps Tactical School: Incubators of American Airpower," in *The Paths of Heaven: The Evolution of Airpower Theory*, ed. Col. Phillip S. Meilinger, USAF (Maxwell AFB, AL: Air University Press, 1997), 212, 217-218.

DISTRIBUTION, TRANSPORTATION NETWORKS, AND FUEL REFINING AND DISTRIBUTION. ACTS ALSO TAUGHT, HOWEVER, THAT THE AIR STRATEGIST MUST ANALYZE EACH COUNTRY INDIVIDUALLY TO DETERMINE THE MOST APPROPRIATE STRATEGY.<sup>38</sup> AS AIR PLANNERS ASSESSED GERMANY, THEY QUICKLY DECIDED (ERRONEOUSLY, IT TURNED OUT) THAT GERMANY'S ELECTRICAL AND TRANSPORTATION SYSTEMS WERE TOO WELL DISPERSED AND TOO REDUNDANT TO OFFER TRULY LUCRATIVE TARGETS. THE GERMAN OIL SYSTEM, IN CONTRAST, OFFERED PLOESTI.

AS AMERICA DEVELOPED ITS AIR STRATEGY AT THE BEGINNING OF WORLD WAR II, BOTH CIVILIAN AND MILITARY LEADERS WERE ALREADY INCLINED TO STRIKE THE ROMANIAN REFINERIES. CAPTURING OR DESTROYING PLOESTI HAD LONG BEEN A SCENARIO IN WAR COLLEGES AROUND THE WORLD. THEREFORE, IT WAS NO SURPRISE WHEN HARRY HOPKINS, PRESIDENTS ROOSEVELT'S PERSONAL ASSISTANT, URGED A STRIKE IN EARLY 1942.<sup>39</sup> THE AAF WAS ALREADY THINKING ALONG THESE LINES. AIR WAR PLANS DOCUMENT 42, THE AAF'S STRATEGIC ROADMAP FOR THE WAR, PLACED OIL ONLY FIFTH IN ITS PRIORITY OF TARGET SETS, YET IT CONJECTURED THAT "IF THESE PLANTS [THE ROMANIAN AND GERMAN REFINERIES] WERE DESTROYED, THE OIL SUPPLY POSITION WOULD BE VERY CRITICALLY AFFECTED AND WOULD PROBABLY BE DECISIVE"<sup>40</sup> AMERICAN OFFICERS IN THE MEDITERRANEAN WERE MORE ENTHUSIASTIC, WITH THE US MILITARY ATTACHÉ IN CAIRO, COLONEL BONNER FELLERS, DECLARING THE REFINERIES "BY FAR THE MOST DECISIVE OBJECTIVE" AND "THE STRATEGIC TARGET OF THE WAR."<sup>41</sup> WHEN BRERETON TOOK COMMAND OF NINTH AIR FORCE IN 1942, THEREFORE, HE LISTED THE DESTRUCTION OF PLOESTI AS ONE OF HIS THREE MAJOR OBJECTIVES.<sup>42</sup>

WHEN ALLIED INTELLIGENCE AGENCIES CONDUCTED DETAILED ANALYSES FOR THE COMBINED BOMBER OFFENSIVE, HOWEVER, DISAGREEMENTS AROSE CONCERNING THE IMPACT OF PLOESTI ON THE AXIS PETROLEUM SYSTEM. THE AAF'S COMMITTEE OF OPERATIONS ANALYSTS (COA) VIEWED PLOESTI AS ONLY ONE PART OF A LARGE AND COMPLEX SYSTEM. THEY CONCLUDED IN A MARCH 1943 REPORT THAT IT WOULD BE NECESSARY TO ATTACK PLOESTI PLUS FOURTEEN OTHER REFINERIES AND THIRTEEN HYDROGENATION PLANTS TO "DESTROY 90% OF PETROLEUM SUPPLIES AND HAVE DISASTROUS CONSEQUENCES ON [THE GERMAN] WAR EFFORT."<sup>43</sup> IN A REVIEW OF THE COA'S ANALYSIS, HOWEVER, THE BRITISH MINISTRY OF ECONOMIC WARFARE (MEW) ARGUED THAT THE PLOESTI REFINERIES WERE CRITICAL IN AND OF THEMSELVES. THE MEW ASSERTED "THAT THE DESTRUCTION OF EITHER THE 13 BERGIUS PLANTS OR THE LEADING ROUMANIAN REFINERIES AT ANY TIME IN THE NEXT TWELVE MONTHS

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<sup>38</sup> Faber, 219.

<sup>39</sup> Dugan and Stewart, 8-9.

<sup>40</sup> AIR WAR PLANS DIVISION 42, *REQUIREMENTS FOR AIR ASCENDANCY*, APPENDIX G, OFFICE OF THE DIRECTOR OF PLANS AND OPERATIONS FILE, RG 165, NATIONAL ARCHIVES AT COLLEGE PARK, COLLEGE PARK, MD.

<sup>41</sup> Dugan and Stewart, 8-9.

<sup>42</sup> Craven and Cate, vol. 2, 23.

<sup>43</sup> COMMITTEE OF OPERATIONS ANALYSTS, *REPORT OF COMMITTEE OF OPERATIONS ANALYSTS WITH RESPECT TO ECONOMIC TARGETS WITHIN THE WESTERN AXIS*, 8 MARCH 1943, PETROLEUM PRODUCTION, AIR WAR PLANS FILE, BOX 67, THE PAPERS OF CARL SPAATZ, LIBRARY OF CONGRESS, WASHINGTON D.C.

WOULD HAVE A CRITICAL, AND PERHAPS DECISIVE, EFFECT ON THE ENEMY'S WAR EFFORT" [EMPHASIS IN ORIGINAL].<sup>44</sup> BOTH ANALYSES, HOWEVER, MADE IT CLEAR THAT PLOESTI WAS AT LEAST A LOGICAL PLACE FOR THE AMERICANS TO BEGIN ATTACKS AGAINST THE GERMAN ECONOMY. DURING THE CASABLANCA CONFERENCE, THEREFORE, GENERALS MARSHALL AND ARNOLD HAD LITTLE DIFFICULTY IN GAINING UNANIMOUS APPROVAL FOR A CONCERTED AIR ATTACK, NAMED OPERATION TIDAL WAVE.<sup>45</sup>

IN APRIL 1943, ARNOLD PASSED THE TASK OF PLANNING TIDAL WAVE TO ONE OF HIS MOST TRUSTED AIR STAFF OFFICERS – COLONEL JACOB SMART. SMART, AN EXPERIENCED BOMBER PILOT, TRAVELED TO EUROPE TO CONSULT BRITISH SPECIALISTS ON PLOESTI, INCLUDING LIEUTENANT COLONEL W. LESLEY FORSTER, WHO HAD MANAGED THE ASTRO ROMANA PLANT FOR EIGHT YEARS. IN A SURPRISING DEPARTURE FROM ACTS HIGH-ALTITUDE BOMBING DOCTRINE, SMART SETTLED ON A LOW-ALTITUDE ATTACK IN ORDER TO INCREASE BOMBING PRECISION, AVOID RADAR DETECTION, ISOLATE THE FIGHTER THREAT ABOVE THE BOMBERS, AND ALLOW BOMBER GUNNERS TO ENGAGE GROUND TARGETS. THIS DIFFERED FROM NINTH AIR FORCE'S PRELIMINARY PLAN, PREPARED BY LT. COL. C. V. WHITNEY, WHICH CALLED FOR A MEDIUM-SIZED, HIGH-LEVEL ATTACK LAUNCHED FROM SYRIAN BASES.<sup>46</sup> TO SIZE THE ATTACK FORCE, SMART AND HIS PLANNERS CAREFULLY CALCULATED THE NUMBER OF BOMBERS REQUIRED TO DESTROY FORTY-ONE CRITICAL AIM POINTS AND THEN DOUBLED THE FORCE STRUCTURE TO ACCOUNT FOR ATTRITION.<sup>47</sup>

SMART BRIEFED HIS PLAN TO THE ALLIED CHIEFS DURING THE TRIDENT CONFERENCE IN MAY 1943.<sup>48</sup> GENERAL DWIGHT EISENHOWER APPROVED THE PLAN IN EARLY JUNE, ALTHOUGH HE WAS SKEPTICAL ANY ATTACK COULD PERMANENTLY KNOCK OUT THE FACILITIES. ADDITIONALLY, EISENHOWER EXPRESSED MISGIVINGS WITH THE AIR STAFF AND MEW'S ANALYSES, SINCE HIS MILITARY INTELLIGENCE CONCLUDED THAT THE GERMAN PETROLEUM BOTTLENECKS WERE IN OIL PRODUCTION AND FUEL DISTRIBUTION RATHER THAN REFINING.<sup>49</sup> SENIOR ALLIED LEADERS IN THE EUROPEAN THEATER OF OPERATIONS REMAINED UNENTHUSIASTIC ABOUT THE OPERATION DUE TO THIS CONTRADICTORY INTELLIGENCE AND THE HIGH RISK INVOLVED WITH THE MISSION PROFILE. IN ITS PLACE, EISENHOWER, AIR CHIEF MARSHALL SIR CHARLES PORTAL (BRITAIN'S CHIEF OF THE AIR STAFF AND COORDINATING OFFICER FOR THE COMBINED BOMBER OFFENSIVE), AIR CHIEF MARSHALL SIR ARTHUR TEDDER (THE COMMANDER OF MEDITERRANEAN AIR COMMAND), AND SPAATZ (COMMANDER OF THE NORTHWEST AFRICAN AIR FORCE) PREFERRED TO EXECUTE OPERATION JUGGLER, WHICH WAS A PLANNED SERIES OF RAIDS AGAINST GERMAN AIRCRAFT PRODUCTION USING THE COMBINED RESOURCES OF EIGHTH AND

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<sup>44</sup> MINISTRY OF ECONOMIC WARFARE, *DETAILED COMMENTARY ON "REPORT OF COMMITTEE OF OPERATIONS ANALYSTS, MARCH 18, 1943,"* 3 APRIL 1943, ANNEX I, 2, AIR WAR PLANS FILE, BOX 67, THE PAPERS OF CARL SPAATZ, LIBRARY OF CONGRESS, WASHINGTON D.C.

<sup>45</sup> Dugan and Stewart, 33-35.

<sup>46</sup> Craven and Cate, vol. 2, 478.

<sup>47</sup> EISENHOWER, 161; FRANK WAY AND MAJOR ROBERT W. STERNFELS, *BURNING HITLER'S BLACK GOLD*, 6<sup>TH</sup> ED, PUBLISHED BY THE AUTHORS, 2002.

<sup>48</sup> Dugan and Stewart, 35-38.

<sup>49</sup> Eisenhower, 161. Ambrose, 113.

NINTH AIR FORCES. ON 23 JULY 1943, MARSHALL AND ARNOLD OVERRULED THESE COMMANDERS, DIRECTING USAAF UNITS IN EUROPE TO GIVE PRIORITY TO TIDAL WAVE.<sup>50</sup>

BEFORE THE AIR STAFF RELINQUISHED ALL TIDAL WAVE RESPONSIBILITY, THEY ASSISTED WITH SOME IMPORTANT LOGISTICAL PREPARATIONS. FIRST, THE AIRFIELDS AROUND BENGHAZI REQUIRED CONSIDERABLE IMPROVEMENT TO HANDLE THREE ADDITIONAL BOMB GROUPS. SECOND, THE AIR STAFF BOLSTERED THE SUPPLY SYSTEM TO ENABLE IT TO HANDLE THE LARGE NUMBER OF B-24s. IN PARTICULAR, THE AIR STAFF CHARTERED THE FAST LINER *MAURTANIA* TO TRANSPORT NEW ENGINES TO THE THEATER, AS THESE HEAVY ITEMS EXCEEDED THE CAPABILITY OF THE AIR TRANSPORT COMMAND. LASTLY, THE AIR STAFF ASSISTED IN THE ACQUISITION OF ORDNANCE AND AIMING EQUIPMENT. TIDAL WAVE REQUIRED NOT ONLY MORE BOMBS THAN NINTH AIR FORCE HAD BEEN USING, BUT ALSO LARGE NUMBERS OF DELAYED-ACTION FUZES TO PROTECT THE BOMBERS ON THEIR SEQUENTIAL LOW-ALTITUDE ATTACKS. SIMILARLY, THE AIR STAFF ASSISTED IN THE ACQUISITION OF 290 BOXES OF BRITISH AND 140 CLUSTERS OF AMERICAN INCENDIARIES THAT PROMISED TO IGNITE FUEL SPILLED BY THE DEMOLITION BOMBS.<sup>51</sup>

#### TIDAL WAVE

SMART TURNED OVER THE TIDAL WAVE PLANNING TO COLONEL EDWARD J. TIMBERLAKE, AN EXPERIENCED B-24 GROUP COMMANDER AND WHO NOW HEADED THE 201ST (PROVISIONAL) COMBAT WING IN ENGLAND. TIMBERLAKE PICKED A STAFF OF TALENTED COMBAT VETERANS TO REFINES THE AIR STAFF PLAN. THIS TEAM CHOSE TO ATTACK PLOESTI FROM THE NORTHWEST, HOPING THAT THE GERMAN DEFENSES WERE NOT ORIENTED IN THIS DIRECTION. ADDITIONALLY, THIS ROUTE PROVIDED GOOD VISUAL LANDMARKS AND ALLOWED SIMULTANEOUS TARGET ATTACKS FOR ALL THE GROUPS. THE FOUR GROUPS ATTACKING PLOESTI WERE TO BE LINE-ABREAST IN THE TARGET AREA, WITH EACH GROUP'S SQUADRONS ATTACKING THEIR ASSIGNED OBJECTIVES IN TRAIL. IN THE EASTERN HALF OF THE ATTACK, PLANNERS ASSIGNED THE ROMANA AMERICANA REFINERY TO THE LIBERANDOS, WHILE MATCHING THE SMALLER CONCORDIA VEGA, STANDARD PETROL, AND UNIREA SPERANTZA REFINERIES TO THE TRAVELING CIRCUS. TO THE WEST, THE PLANNERS ASSIGNED THE MISSION'S TOP PRIORITY, THE ASTRO ROMANA PLANT, TO THE PYRAMIDERS AND GAVE ONE SECTION OF THE EIGHT BALLS THE COLOMBIA AQUILA REFINERY. TWO SMALLER FORMATIONS WERE TO ATTACK TARGETS AWAY FROM PLOESTI. THE FIRST OF THESE, THE OTHER HALF OF THE 44TH BOMB GROUP, WAS TO ATTACK THE CREDITUL MINIER REFINERY IN THE NEARBY CITY OF BRAZI. THE VIRGIN SKY SCORPIONS WERE TO ATTACK THE STEAUA ROMANA REFINERY, EIGHTEEN MILES NORTH OF PLOESTI IN CAMPINA (SEE FIGURE 2). THE STRUNG-OUT GROUP FORMATIONS WERE TO PROTECT THEMSELVES FROM BOMB FRAGMENTATION BY USING DELAYED ACTION

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<sup>50</sup> Craven and Cate, vol. 2, 683-684.

<sup>51</sup> Craven and Cate, vol. 2, 479.



FUZES. THE FIRST AND SECOND WAVE SQUADRONS SET DELAYS OF FROM ONE TO SIX HOURS WHILE THE TRAIL SQUADRONS SET THEIR FUZES TO EXPLODE AFTER ONLY FORTY-FIVE SECONDS.<sup>52</sup>

ALTHOUGH ONLY SENIOR OFFICERS WERE AWARE OF THE TARGET, ALL THE B-24 GROUPS BEGAN PREPARATIONS FOR THE UPCOMING STRIKE. THE EIGHTH AIR FORCE GROUPS BEGAN LOW-LEVEL FLYING TRAINING IN EAST ANGLIA, WHILE THE NINTH AIR FORCE GROUPS CONDUCTED TWO SMALL LOW-LEVEL ATTACKS AGAINST SICILY AND ITALY AS A PROOF OF THE CONCEPT. TIMBERLAKE'S STAFF PREPARED SPECIAL MAPS CONTAINING OBLIQUE VIEWS OF IMPORTANT NAVIGATIONAL POINTS, A TERRAIN MODEL OF THE TARGET, AND EVEN A FULL-LENGTH MOVIE TO FAMILIARIZE THE AIRCREW WITH THE ROUTE. THE 93D, 44<sup>TH</sup>, AND 389<sup>TH</sup> BOMB GROUPS DEPLOYED TO NORTH AFRICA BETWEEN 26 JUNE AND 3 JULY.<sup>53</sup> THE FIVE ASSEMBLED GROUPS SPENT THE NEXT TWO WEEKS STANDARDIZING PROCEDURES DURING ATTACKS AGAINST SICILY, ITALY, AND CRETE.<sup>54</sup> OVERALL, THE PLOESTI GROUPS FLEW 1,183 SORTIES, TWICE THE NORMAL EFFORT, AGAINST SEVENTEEN TARGETS BETWEEN 2 AND 19 JULY, ENDING WITH A SUBSTANTIAL RAID ON ROME.<sup>55</sup>

AFTER THIS, IX BOMBER COMMAND STOOD DOWN, AND THE PLANNING CELL FINALLY BRIEFED THE BOMBER COMMANDERS ON THE PLOESTI MISSION. DURING THESE BRIEFINGS, INTELLIGENCE PERSONNEL, UNAWARE OF THE GERMAN DEFENSES SURROUNDING THE REFINERIES, LARGELY DISCOUNTED THE THREAT POSED BY THE ROMANIANS. NEVERTHELESS, THE SURPRISED FLYERS, INCLUDING GENERAL ENT, PREDICTED UNACCEPTABLE LOSSES AND VEHEMENTLY RECOMMENDED A SWITCH TO HIGH-ALTITUDE TACTICS. COLONEL KANE, THE 98<sup>TH</sup> BOMB GROUP COMMANDER, ASSERTED THAT "SOME IDIOT ARMCHAIR WARRIOR IN WASHINGTON" DREAMED UP THE PLAN.<sup>56</sup> HOWEVER, BRERETON WAS UNWILLING TO CHANGE A PLAN THAT EISENHOWER HAD ALREADY APPROVED. PRESSING AHEAD, THEREFORE, IX BOMBER COMMAND BUILT A SIMULATED TARGET COMPLEX IN THE TUNISIAN DESERT, AGAINST WHICH THE ENTIRE TASK FORCE PRACTICED LOW-ALTITUDE ATTACKS ON 28 AND 29 JULY. MAINTENANCE PERSONNEL WORKED THEMSELVES RAGGED SUPPORTING THESE TRAINING MISSIONS, AS THEY WERE ALSO EQUIPPING THE BOMBERS WITH COCKPIT ARMOR PLATE, AND LOW-ALTITUDE BOMB SIGHTS, AND LONG-RANGE FUEL TANKS IN THE OUTBOARD SECTION OF THE WINGS AND IN THE BOMB BAY. AFTER COMPLETING THESE MODIFICATIONS, THE MECHANICS WORKED FORTY-EIGHT HOURS STRAIGHT TO REPLACE THREE HUNDRED ENGINES WORN BY SAND.<sup>57</sup>

MANNING THE AVAILABLE AIRCRAFT STRAINED IX BOMBER COMMAND PERSONNEL. THIS MISSION WAS TO BE A MAXIMUM EFFORT, SO NINTH AIR FORCE EVEN SCHEDULED CREWS WHO HAD COMPLETED THEIR THIRTY-MISSION TOURS. MAINTENANCE ACTUALLY READIED SEVENTEEN MORE COMBAT READY AIRCRAFT THAN CALLED FOR IN THE FIELD ORDER. WHILE THIS PROVIDED ENT OPTIONS TO DEAL WITH AIR ABORTS, IT FURTHER EXACERBATED THE AIRCREW MANNING PROBLEM. MANY

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<sup>52</sup> Craven and Cate, vol. 2, 479; Dugan and Stewart, 41-42.

<sup>53</sup> Craven and Cate, vol. 2, 479.

<sup>54</sup> Dugan and Stewart, 29-30, 53.

<sup>55</sup> Craven and Cate, vol. 2, 463-465, 479.

<sup>56</sup> Way and Sternfels, 31.

<sup>57</sup> Craven and Cate, vol. 2, 479; Dugan and Stewart, 43-66; Way and Sternfels, 22.

AIRCREW WERE PRESSED INTO SERVICE IN SPITE OF DEBILITATING DYSENTERY, LACK OF QUALIFICATION, AND UNFAMILIARITY WITH OTHER CREW MEMBERS. THE CREW PLAN COMPLETELY COLLAPSED THE AFTERNOON PRIOR TO THE RAID, WHEN A MESSAGE ARRIVED FROM GENERAL ARNOLD FORBIDDING SMART AND BRERETON FROM PARTICIPATING. THIS LATE DECISION, AGGRAVATED BY BRERETON'S REFUSAL TO LET TIMBERLAKE FLY, RESULTED IN A CASCADE OF CHANGES THAT SPLINTERED THE CAREFULLY TRAINED LEAD CREWS AND KNOCKED THE PLANNING NAVIGATOR OFF THE MISSION.<sup>58</sup>

NONETHELESS, 178 BOMBERS CUED UP FOR TAKE-OFF ON THE MORNING OF 1 AUGUST 1943. THE BOMBERS DEPARTED AT TWO-MINUTE INTERVALS AND JOINED IN FIVE DIFFERENT GROUP FORMATIONS. THE FIRST CASUALTIES OF THE DAY OCCURRED WHEN ONE OF THE PYRAMIDER B-24S CRASHED SHORTLY AFTER TAKE-OFF. ALL BUT TWO OF THE CREW WERE KILLED WHEN THIS AIRCRAFT STRUCK THE GROUND AS THE PILOT WAS TRYING TO RETURN TO HIS DUST-CLOGGED FIELD AFTER LOSING AN ENGINE. AS THE REMAINING B-24S FORMED UP FOR THE LONG OVER WATER FLIGHT, THE TWENTY-NINE LIBERANDOS (376<sup>TH</sup> BOMB GROUP) TOOK THE LEAD, TRAILED BY THIRTY-NINE B-24S OF THE TRAVELING CIRCUS (93<sup>RD</sup> BOMB GROUP), FORTY-SEVEN OF THE PYRAMIDERS (98<sup>TH</sup> BOMB GROUP), AND THIRTY-SEVEN OF THE EIGHT BALLS (44<sup>TH</sup> BOMB GROUP). TWENTY-SIX SKY SCORPION (389<sup>TH</sup> BOMB GROUP) B-24S FORMED THE TRAIL GROUP.

THE ENTIRE AMERICAN PLAN HINGED ON TACTICAL SURPRISE, YET THE GERMANS KNEW OF THE MISSION ALMOST IMMEDIATELY. GERMAN SIGNAL INTERCEPT UNITS DECODED AN ALLIED ALERT ORDER CONCERNING THE FORCE, AND THE GERMANS MAY HAVE ALSO RECEIVED A REPORT FROM WEATHER FORECASTERS HIDING NEAR THE BOMBER BASES. WITH THIS ALERT, GERMAN AIR DEFENSE CONTROLLERS PLACED FIGHTERS AND ANTI-AIRCRAFT BATTERIES ON READY STATUS. MEANWHILE THE LARGE BOMBER FORMATION BEGAN TO STRAGGLE OUT OVER THE MEDITERRANEAN. THE 98TH BOMB GROUP, WITH THE OLDEST AIRCRAFT AND FLYING AT LOWER POWER SETTINGS TO CONSERVE FUEL, EVENTUALLY TRAILED OUT OF SIGHT OF THE 93RD BOMB GROUP.<sup>59</sup>

NEARING LAND-FALL, AN ALMOST UNBELIEVABLE COMBINATION OF CIRCUMSTANCES OCCURRED TO SPLIT IRREVOCABLY THE TWO SECTIONS OF BOMBERS. WITHIN SIGHT OF CORFU, THE MISSION'S LEAD AIRCRAFT INEXPLICABLY WENT OUT OF CONTROL AND CRASHED INTO THE SEA. THE WINGMAN, CARRYING THE DEPUTY ROUTE NAVIGATOR, BROKE FORMATION TO SEARCH FOR SURVIVORS AND THEN RETURNED TO AFRICA. THE REMAINING BOMBERS ENCOUNTERED CUMULOUS CLOUDS OVER THE PINDUS MOUNTAINS. STATISTICALLY, THIS WAS THE RAINIEST SPOT IN EUROPE, YET THE BOMBERS DID NOT HAVE A WELL-COORDINATED PLAN TO DEAL WITH THIS CONTINGENCY.<sup>60</sup> ENDEAVORING TO STAY ON TIME, THE TWO LEAD GROUPS SKIRTED OVER THE TOPS OF THE CLOUDS, WHERE THEY FOUND A STRONG TAILWIND. THE THREE REAR GROUPS, INSTEAD, ACCOMPLISHED A TIME-CONSUMING WEATHER PENETRATION PROCEDURE AT LOWER ALTITUDE. FOR THIS, THE FORMATION CIRCLED CLEAR OF THE WEATHER WHILE THREE-SHIP ELEMENTS SPLIT OFF AND PENETRATED THE WEATHER IN TRAIL. AS THE AIRCRAFT EMERGED

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<sup>58</sup> Dugan and Stewart, 65-80.

<sup>59</sup> Dugan and Stewart, 84-91; Way and Sternfels, 31.

<sup>60</sup> Army Air Force Evaluation Board, 6.

ON THE OTHER SIDE OF THE WEATHER, THE GROUP LEADS AGAIN CIRCLED THE FORMATION TO ALLOW THE DISPARATE ELEMENTS TO JOIN. THE TRAIL B-24S FAILED TO BREAK RADIO SILENCE TO COORDINATE A RENDEZVOUS WITH THE LEAD GROUPS OR TO INFORM THEM THAT BULGARIAN FIGHTERS HAD SPOTTED AND ATTEMPTED TO ENGAGE THE FORMATION BEFORE IT ENTERED THE CLOUDS. NEARING THE TARGET AREA, COLONEL KANE, LEADING THE PYRAMIDERS AND THE OTHER TWO TRAIL GROUPS, MISTOOK THE TAIL-END SKY SCORPIONS AS ONE OF THE MISSING LEAD GROUPS. AS SUCH, HE SPENT PRECIOUS TIME WEAVING THE PYRAMIDERS IN A MISGUIDED EFFORT TO REGAIN THE PROPER ATTACK ORDER.<sup>61</sup>

AS THE LEAD GROUP APPROACHED THE TARGET, A CRITICAL NAVIGATION ERROR DESTROYED ANY COHESION THAT REMAINED IN THE ATTACK. THE LEAD LIBERANDO CREW, WHICH INCLUDED COLONEL COMPTON, THE GROUP COMMANDER, AND GENERAL ENT, MISTOOK THE PRE-IP FOR THE TARGET INITIAL POINT (IP), TURNING THE TWO LEAD GROUPS ON A COURSE AWAY FROM PLOESTI AND INTO THE MOUTH OF BUCHAREST'S ANTI-AIRCRAFT AND FIGHTER DEFENSES. AS PLOESTI PASSED OFF THE LEFT SIDE, THE 93<sup>RD</sup> BOMB GROUP, SECOND IN THE ATTACK ORDER, RECOGNIZED THE ERROR AND TURNED EAST ONTO A DIRECT COURSE FOR THE REFINERIES. APPROACHING THE TARGETS FROM THIS UNPLANNED DIRECTION, THE TRAVELING CIRCUS CREWS MET A WALL OF ANTI-AIRCRAFT FIRE THAT DOWNED THE GROUP'S LEAD AIRCRAFT. THE REMAINING BOMBERS DROPPED ON ANY TARGET THEY COULD FIND, BECOMING BADLY SPLIT AFTER FLYING THROUGH THE FLAMES OF THE REFINERIES. COMING OFF TARGET, COLONEL BROWN ASSUMED THE LEAD OF THE 93<sup>RD</sup>, BUT WAS ABLE TO ASSEMBLE ONLY FIFTEEN (ONLY FIVE UNDAMAGED) OF THE THIRTY-FOUR AIRCRAFT THAT ENTERED THE TARGET AREA. THIS SCRATCH FORCE WAS FURTHER MAULED BY GERMAN ME-109S AND ROMANIAN IARs AS THE BOMBERS DEPARTED THE TARGET AREA. FINALLY RECOGNIZING BUCHAREST, COMPTON AND ENT TURNED THE LIBERANDOS BACK TOWARD PLOESTI ON A NORTHEAST RUN-IN. SEEING EXPLOSIONS ON THEIR BRIEFED TARGETS AND THE DEFENSES HAMMERING THE TRAVELING CIRCUS BOMBERS, COMPTON CLEARED HIS 376<sup>TH</sup> BOMB GROUP TO ATTACK TARGETS OF OPPORTUNITY. THE FORMATION DISINTEGRATED AS SOME CREWS JETTISONED THEIR BOMBS IMMEDIATELY, MOST VEERED TO THE EAST AROUND THE TOUGHEST DEFENSES, AND A FEW STALWART CREWS BRAVED THE DEFENSES TO FIND WORTHWHILE TARGETS.<sup>62</sup>

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<sup>61</sup> Dugan and Stewart, 92-104.

<sup>62</sup> Dugan and Stewart, 105-136.

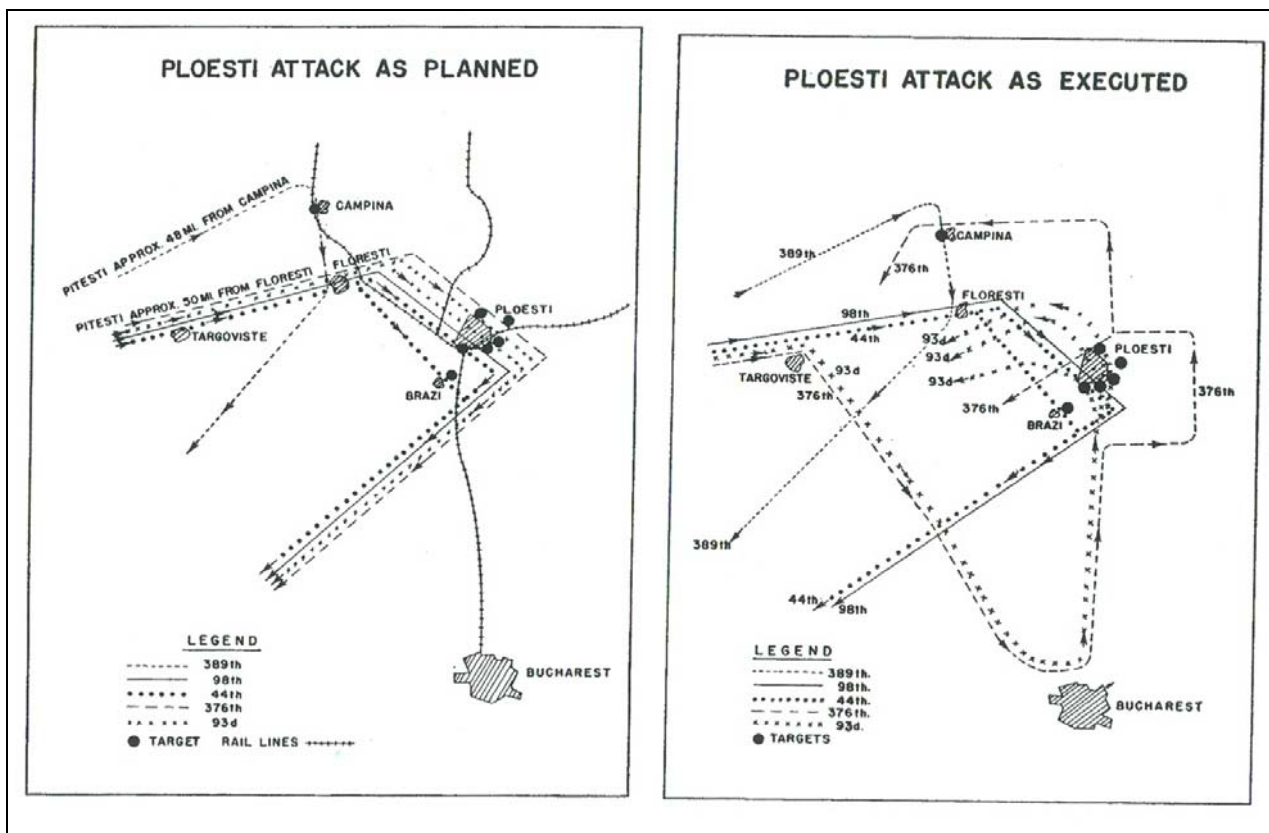


FIGURE 2. THE PLOESTI ATTACK AS PLANNED AND EXECUTED  
SOURCE: CRAVEN AND CATE, VOL. 2, OFFICE OF AIR FORCE HISTORY, 1983

THE TRAIL GROUPS ARRIVED HALF AN HOUR AFTER THE START OF THE ATTACK TO FIND THE DEFENSES ACTIVE AND SOME OF THEIR INTENDED TARGETS ALREADY IN FLAMES.<sup>63</sup> AS KANE'S 98TH BOMB GROUP ROLLED-OUT ON THEIR COURSE NORTH OF PLOESTI, THEY WERE RAKED BY FIRE FROM GERSTENBERG'S WELL-PLACED FLAK TRAIN. ADDING TO THE MAYHEM, THE EIGHT BALL BOMBERS HAD TO MANEUVER VIOLENTLY TO AVOID COLLISIONS WITH LIBERANDOS STILL ATTACKING FROM THE NORTHEAST OR DEPARTING WESTBOUND. THE SCENE BECAME EVEN MORE CONFUSED AS THE UNAWARE SKY SCORPIONS FLOWED SOUTH FROM THEIR CAMPINA TARGET INTO THE MIDDLE OF THE MELEE. KANE AND JOHNSON LED THEIR GROUPS ON THEIR BRIEFED TARGETS, FLYING THROUGH A "TUNNEL OF FIRE" CREATED BY BURNING FUEL TANKS AND EXPLODING BOMBS, HIDING DENSE ANTI-AIRCRAFT FIRE AND BARRAGE BALLOON CABLES. THE PYRAMIDERS AND EIGHT BALLS WERE SHOT TO PIECES IN THE GAUNTLET. EVEN WORSE, THESE BOMBERS TOOK THE BRUNT OF 125 PROWLING AXIS INTERCEPTORS AS THEY BROUGHT UP THE REAR OF THE DEPARTING RAID. IN ALL, KANE LOST TWENTY-TWO OF THIRTY-SEVEN B-24s, WHILE JOHNSON LOST NINE OF SIXTEEN. ONLY TWO PORTIONS OF THE ATTACK WENT AS PLANNED: THE RAID BY THE OTHER HALF OF THE 44<sup>TH</sup> BOMB GROUP SOUTH OF PLOESTI AND THE ATTACK BY THE 389TH BOMB GROUP IN THE MOUNTAINS TO THE NORTH. THE FIRST WAVE OF BOMBERS HAD NOT TOUCHED THESE TARGETS, SO BOTH GROUPS ATTACKED AS PLANNED AND IN GOOD ORDER. ALTHOUGH

<sup>63</sup> Army Air Force Evaluation Board, 7.

HARRIED BY ANTI-AIRCRAFT FIRE AND FIGHTERS, THESE B-24S BOMBED ACCURATELY, LOSING ONLY TWO OF TWENTY-ONE EIGHT BALLS AND SIX OF TWENTY-NINE SKY SCORPIONS.<sup>64</sup>

THE DISORGANIZED FORCE STRAGGLED OUT OF THE TARGET AREA, WITH ISOLATED BOMBERS JOINING TOGETHER WHEN OPPORTUNITIES AROSE. WHILE SOME SECTIONS WERE UNMOLESTED, BULGARIAN AVIAS, GERMAN ME-109S AND EVEN A PAIR OF GERMAN ME-110S ON A DELIVERY FLIGHT ATTACKED ANY BOMBERS THEY COULD FIND. THE AMERICANS FACED THE SAME MOUNTAINOUS WEATHER ON THE WAY OUT THAT HAD BEDEVILED THEIR APPROACH, RESULTING IN FURTHER DISINTEGRATION OF THE FORMATIONS AND THE LOSS OF TWO MORE BOMBERS IN A MID-AIR COLLISION. THE FINAL ENGAGEMENT OCCURRED OVER THE IONIAN SEA, WHEN GERMAN ME-109S FROM KALAMAKI, GREECE ATTACKED THE BOMBER STREAM, MORTALLY DAMAGING FOUR BOMBERS TO THE LOSS OF TWO FIGHTERS. THROUGHOUT THE NIGHT, BATTLE-DAMAGED AND FUEL STARVED BOMBERS STRAGGLED ALL OVER THE MEDITERRANEAN.<sup>65</sup> IN ALL, NINETY-TWO BOMBERS REACHED BENGHAZI, NINETEEN LANDED AT OTHER ALLIED FIELDS IN NORTH AFRICA, CYPRUS, SICILY, AND MALTA, SEVEN LANDED IN NEUTRAL TURKEY, AND THREE CRASHED AT SEA.<sup>66</sup>

## RESULTS

AS DAWN BROKE ON THE SECOND OF AUGUST, IT WAS CLEAR THAT THE SURPRISE RAID HAD NOT CAUGHT THE GERMANS UNPREPARED. NINTH AIR FORCE LOST FIFTY-FOUR B-24S ON THE RAID, WITH FIFTY-FIVE ADDITIONAL BOMBERS DAMAGED. MANY OF THE DAMAGED BOMBERS NEVER FLEW AGAIN. THE CASUALTY ROLLS INCLUDED 446 AIRCREW DEAD OR MISSING, FIFTY-FOUR WOUNDED, AND SEVENTY-NINE INTERRED IN TURKEY. IN CONTRAST TO THE 178 BOMBERS LAUNCHED ON THE RAID, NINTH AIR FORCE COULD ONLY MUSTER THIRTY-THREE MISSION CAPABLE AIRCRAFT THE NEXT DAY. THE FIVE BOMB GROUPS THAT EXECUTED THE PLOESTI RAID WERE ABLE TO RECONSTITUTE ENOUGH TO LAUNCH A RAID ON WIENER NEUSTADT ON 13 AUGUST, BUT FOR ALL EFFECTIVE PURPOSES "TIDAL WAVE WAS THE END OF NINTH AIR FORCE AS A BOMBER COMMAND..."<sup>67</sup>

ONE THE OTHER SIDE OF THE MEDITERRANEAN, THE GERMANS EXPRESSED SURPRISE THAT THE AMERICANS USED SUCH DARING TACTICS. WHILE RECOGNIZING THE UTILITY OF LOW-LEVEL ATTACKS, GERMAN FIGHTER LEADERS WERE AMAZED THAT THE AMERICANS THOUGHT THEY COULD ACHIEVE ANY DEGREE OF SURPRISE FOLLOWING SUCH A LONG FLIGHT THROUGH AXIS TERRITORY. THE DEFENDERS FELT THEY HAD ACCOMPLISHED THEIR MISSION, AS THEY BATTERED A STRONG BOMBER FORCE WHILE

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<sup>64</sup> Dugan and Stewart, 137-170.

<sup>65</sup> Dugan and Stewart, 191-212. Becker, 469.

<sup>66</sup> Craven and Cate, vol. 2, 482.

<sup>67</sup> Craven and Cate, vol. 2, 483; Dugan and Stewart, 212.

LOSING ONLY FOUR ME-109S, TWO ME-110S, A FEW ROMANIAN AND BULGARIAN FIGHTERS, AND ABOUT FIFTEEN AIRCREW.<sup>68</sup>

THE BOMB DAMAGE TOOK LONGER TO ASCERTAIN. RAF MOSQUITOES CONDUCTED RECONNAISSANCE IN THE FOLLOWING WEEKS, WITH THE PHOTOS INDICATING "CONSIDERABLE SHORT-TERM DAMAGE AND A PROMISING DEGREE OF LONG-TERM DAMAGE."<sup>69</sup> HOWEVER, AN ASSESSMENT CONFERENCE IN WASHINGTON ISSUED A MORE SOBER AND ACCURATE ANALYSIS, CONCLUDING "THE MOST IMPORTANT EFFECT WAS TO ELIMINATE THE CUSHION BETWEEN PRODUCTION AND CAPACITY."<sup>70</sup> POST-WAR ANALYSIS PROVED THIS SUPPOSITION CORRECT, AS THE LARGEST REFINERIES WERE RELATIVELY UNAFFECTED BY THE RAID. THE ROMANO AMERICANA REFINERY, THE MAIN OBJECTIVE OF THE MISSION, RECEIVED NO DAMAGE. PRODUCTION AT THE LARGE ASTRO ROMANA REFINERY, DROPPED FROM 121,000 TONS TO 55,000 TONS IN THE MONTH FOLLOWING THE ATTACK, BUT THEN EXCEEDED ITS PRE-ATTACK PRODUCTION LEVELS THEREAFTER. THE STANDARD REFINERY WAS HIT BY ONLY THREE BOMBS, AND THESE CAUSED NO DAMAGE.

SOME OF THE SMALLER PLOESTI REFINERIES, HOWEVER, WERE HIT HARD. BLAST AND FIRE DAMAGED THE CONCORDIA VEGA REFINERY, SERIOUSLY AFFECTING PRODUCTION. SIMILAR DAMAGE TO THE COLOMBIA AQUILA REFINERY KEPT IT OUT OF COMMISSION UNTIL 25 JULY 1944. THE BOMBERS CAUSED THE MOST SIGNIFICANT DAMAGE AT THE REFINERIES IN BRAZI AND CAMPINA. THE EIGHT BALLS PUT FIFTY-NINE BOMBS IN THE CREDITUL MINIER REFINERY, PERMANENTLY SHUTTING THE FACILITY DOWN. SEVENTY-FOUR SKY SCORPION BOMBS HIT STEAUA ROMANO, WHICH STOPPED OPERATIONS UNTIL JANUARY 1944 AND NEVER RESUMED FULL PRODUCTION.<sup>71</sup>

THE OVERALL DISAPPOINTING RESULTS STEMMED IN PART FROM THE FACT THAT THE GERMANS DEFUSED MANY OF THE DELAYED-ACTION BOMBS BEFORE THEY COULD EXPLODE.<sup>72</sup> FURTHER, THE ROMANIANS REPAIRED MUCH OF THE DAMAGE AND ACTIVATED IDLE UNITS TO REPLACE LOST CAPACITY. THEREFORE, THE PLOESTI PRODUCTION TOTALS DROPPED FROM 379,000 TONS TO 105,000 TONS FOR THE MONTH OF THE ATTACK, BUT THEN RESUMED NORMAL PRE-ATTACK LEVELS UNTIL APRIL 1944.<sup>73</sup> ALTHOUGH EISENHOWER TERMED THE RAID "REASONABLY SUCCESSFUL" HE ALSO SUMMED UP THE EFFORT BY STATING THAT "AS USUAL, MATHEMATICAL CALCULATIONS COULD NOT WIN OVER UNEXPECTED CONDITIONS."<sup>74</sup>

## CONCLUSION

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<sup>68</sup> Dugan and Stewart, 211-212, 221-222.

<sup>69</sup> NINTH AIR FORCE, *RUMANIAN OIL TARGETS, APPRAISAL OF ATTACK BY NINTH USAAF ON 1 AUG. 1943*, PART A.

<sup>70</sup> Dugan and Stewart, 231.

<sup>71</sup> Army Air Force Evaluation Board, Appendix A, 9-20.

<sup>72</sup> Dugan and Stewart, 134-135, 153, 170, 222-223.

<sup>73</sup> Army Air Forces Evaluation Board, 8, Exhibit 18.

<sup>74</sup> Eisenhower, 161.

INITIAL OPERATIONS AGAINST PLOESTI DID NOT MEET THE AMERICAN'S GRAND EXPECTATIONS. AIR STRATEGISTS BELIEVED THAT PLOESTI WAS A VITAL LINK IN THE GERMAN ECONOMY. FURTHER, THEY BELIEVED THAT THE DESTRUCTION OF THE REFINERIES WAS WELL WITHIN THEIR POWERS. THEY ERRED IN EACH OF THESE ASSUMPTIONS. WHILE THE GERMANS IMPORTED MUCH OF THEIR OIL FROM PLOESTI, THEY WERE NOT SO DEPENDENT ON ROMANIAN OIL THAT THEY COULD NOT MAKE AT LEAST SHORT-TERM ADJUSTMENTS. FURTHER, THE GERMAN ECONOMY DID NOT DEPEND HEAVILY ON OIL, AS INDUSTRIAL PRODUCTION AND TRANSPORTATION WERE LARGELY BASED ON COAL. TACTICALLY, THE HALVERSON AND TIDAL WAVE ATTACKS DEMONSTRATED THE SAME LESSONS LEARNED BY EIGHTH AIR FORCE UNITS IN ENGLAND: UNESCORTED BOMBER ATTACKS INVITED HEAVY LOSSES AND OFTEN DID NOT RESULT IN LASTING EFFECTS. AIR STRATEGISTS WOULD NEED TO TAKE A MORE SOPHISTICATED APPROACH IF THEY WERE TO FIND THE KEY TO THE DEFEAT OF GERMANY.

## CHAPTER 2

### PLOESTI – A COMPREHENSIVE APPROACH TO LIMITED OBJECTIVES

*IT IS NOT OUT OF HEEDLESSNESS OR COWARDICE THAT THE GERMANS KEEP ABANDONING IMMENSE NUMBERS OF TANKS AND ARMORED VEHICLES BY THE ROADSIDES OF FRANCE...THOSE TANKS AND TRUCKS ARE OUT OF GASOLINE.*

*GENERAL H. H. ARNOLD, OCTOBER 1944*

EIGHT MONTHS OF COMBAT EXPERIENCE BROUGHT A NEW APPROACH TO THE ATTACK AGAINST PLOESTI. WHEN THE AAF RETURNED TO THIS TARGET COMPLEX IN APRIL 1944, THEY FOUGHT WITH NEW ORGANIZATIONS AND NEW TACTICS. MORE IMPORTANTLY, AIR LEADERS BROUGHT A NEW STRATEGY COUPLED WITH REALISTIC EXPECTATIONS FOR WHAT BOMBING COULD ACHIEVE. THE AAF'S 1944 ASSAULT PROGRESSED THROUGH THREE PHASES: THE MARSHALLING YARD ATTACKS OF APRIL AND MAY, THE INNOVATIVE BUT COSTLY P-38 RAID OF 10 JUNE, AND THE FINAL, DIRECT STRIKES AGAINST THE REFINERIES FROM LATE JUNE THROUGH MID-AUGUST. IN THE END, THIS BATTERING ACHIEVED THE AAF'S OPERATIONAL AND STRATEGIC OBJECTIVES, BUT THE AIRCREWS STRUGGLED WITH TACTICAL PROBLEMS THROUGHOUT THE SUSTAINED EFFORT.

### A NEW APPROACH

THE AAF REVAMPED ITS ORGANIZATION IN EUROPE BETWEEN THE TIDAL WAVE ATTACK AND THE 1944 OFFENSIVE AGAINST THE REFINERIES. IN AUGUST 1943, BRERETON MOVED NINTH AIR FORCE HEADQUARTERS TO ENGLAND TO CREATE AN ORGANIZATION SPECIFICALLY DESIGNED FOR THE TACTICAL SUPPORT OF OPERATION OVERLORD. TWELFTH AIR FORCE, WHICH WAS THEN SUPPORTING LAND OPERATIONS IN ITALY, ABSORBED NINTH AIR FORCE'S UNITS. SOON, HOWEVER, THE AAF USED XII BOMBER COMMAND TO FORM THE NUCLEUS FOR FIFTEENTH AIR FORCE. THIS ORGANIZATION WAS UNDER THE ADMINISTRATIVE CONTROL OF THE NEW MEDITERRANEAN ALLIED AIR FORCES COMMANDED BY GENERAL IRA EAKER. HOWEVER, EAKER COULD ONLY UTILIZE ITS ASSETS WHEN LOCAL ACTIVITIES DID NOT CONFLICT WITH THE FIFTEENTH'S PRIMARY MISSION OF THE STRATEGIC BOMBING OF GERMANY. FOR THESE STRATEGIC MISSIONS, THE BRITISH-BASED US STRATEGIC AIR FORCES (USSTAF) CONTROLLED BOTH FIFTEENTH AIR FORCE IN ITALY AND EIGHTH AIR FORCE IN ENGLAND.<sup>75</sup> BY THE TIME OF THE RENEWED BOMBING OFFENSIVE, FIFTEENTH AIR FORCE CONSISTED OF ONE LARGE B-17 WING

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<sup>75</sup> Wesley Frank Craven and James Lea Crate, eds., *The Army Air Forces in World War II*, vol. 2: *Europe: Torch to Pointblank August 1942 to December 1943* (Washington, D.C.: Office of Air Force History, 1983), 744-756.



AND FOUR B-24 WINGS MADE UP OF A TOTAL OF TWENTY-ONE BOMB GROUPS. XV FIGHTER COMMAND CONSISTED OF ONE P-38 WING AND ONE P-51 WING, TOTALING SEVEN FIGHTER GROUPS<sup>76</sup>

TO COMMAND THESE NEW ORGANIZATIONS, THE AAF TURNED TO PROVEN COMBAT LEADERS WHO WERE WELL CONNECTED INSIDE THE ORGANIZATION. GENERAL CARL "TOOEY" SPAATZ, THE COMMANDER OF USSTAF, WAS UNDOUBTEDLY THE AAF'S PREMIER FIELD COMMANDER IN WORLD WAR II. SPAATZ GRADUATED FROM WEST POINT IN 1914, AND BEGAN FLIGHT TRAINING IN 1915 AFTER A SHORT INFANTRY STINT IN HAWAII. SPAATZ WAS A PILOT WITH WITH 1<sup>ST</sup> AERO SQUADRON IN THE PUNITIVE EXPEDITION IN MEXICO IN 1916, AND THEN SERVED AS A FIGHTER PILOT IN FRANCE IN WORLD WAR I. BETWEEN THE WARS, SPAATZ WAS CENTRAL TO THE DEVELOPMENT OF THE ARMY AIR CORPS, CONDUCTING RECORD-SETTING DEMONSTRATION FLIGHTS AND SERVING IN KEY AIR STAFF POSITIONS. SPAATZ GRADUATED FROM CGSC IN 1936 ALTHOUGH IT "WAS SAID THAT NO MORE IRREVERENT STUDENT PASSED THROUGH THE SCHOOL."<sup>77</sup> BASED ON THEIR LONG PERSONAL AND PROFESSIONAL RELATIONSHIP, ARNOLD APPOINTED SPAATZ TO SOME OF THE MOST CRITICAL AIR STAFF POSITIONS IN THE RUN-UP TO WORLD WAR II, INCLUDING CHIEF OF THE AIR PLANS DIVISION, ARNOLD'S PERSONAL ASSISTANT, AND CHIEF OF THE AIR STAFF. IN JULY 1942, SPAATZ TOOK COMMAND OF THE FLEDGLING EIGHTH AIR FORCE AS IT FORMED IN ENGLAND. WHEN THE FOCUS OF AMERICAN EFFORTS TURNED TO NORTH AFRICA, SPAATZ COMMANDED ALLIED AIR UNITS SUPPORTING THE EASTWARD DRIVE FROM THE TORCH LANDINGS.<sup>78</sup>

WHILE SPAATZ DIRECTED US AIR STRATEGY IN EUROPE, TACTICAL DIRECTION FELL TO THE NUMBERED AIR FORCE COMMANDERS. MAJOR GENERAL NATHAN TWINING WAS THE CAPABLE COMMANDER OF FIFTEENTH AIR FORCE. TWINING WAS COMMISSIONED FROM WEST POINT IN 1919 AND HAD A DISTINGUISHED FLYING CAREER BETWEEN THE WARS. HE SERVED IN THE OFFICE OF THE CHIEF OF STAFF OF THE AIR CORPS FROM 1940 UNTIL 1942, BUILDING STRONG RELATIONSHIPS WITH SPAATZ AND ARNOLD. TWINING COMMANDED THIRTEENTH AIR FORCE IN THE PACIFIC DURING THE SOLOMONS CAMPAIGN, SO HE WAS WELL-PREPARED TO ASSUME THE LARGER COMBAT COMMAND.<sup>79</sup>

AS SPAATZ TOOK COMMAND, CONFLICT WAS BREWING OVER THE STRATEGY OF THE COMBINED BOMBER OFFENSIVE. SINCE OVERBLOWN EXPECTATIONS CONCERNING GERMANY'S ECONOMIC COLLAPSE HAD NOT MATERIALIZED, BRITISH AND AMERICAN STRATEGISTS ARGUED ABOUT WHICH SET OF TARGETS WOULD PROVIDE THE MOST BENEFIT IN LIGHT OF THE IMPENDING NORMANDY INVASION. SPAATZ FAVORED AN ATTACK ON OIL, NOT BECAUSE OF ITS POSSIBLE EFFECT ON INDUSTRY, BUT BECAUSE OF ITS IMPORTANCE TO GERMANY'S FIELDIED FORCES. THE CRITICALITY OF FUEL TO THE

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<sup>76</sup> *THE AIR BATTLE OF PLOESTI*, 2-3.

<sup>77</sup> Copp, 26-30, 83-85, 147, 313.

<sup>78</sup> Ancell with Miller, 444.

<sup>79</sup> Ancell with Miller, 451.

LUFTWAFFE CAME TO USSTAF'S ATTENTION IN JANUARY 1944 WHEN INTELLIGENCE INDICATED THAT THE GERMANS WERE CONCENTRATING FIGHTER DEFENSES AROUND THE REFINERIES.<sup>80</sup>

SPAATZ PASSED THIS INFORMATION TO THE USSTAF SPECIAL PLANNING COMMITTEE, WHICH GENERAL ANDERSON, USSTAF'S DEPUTY COMMANDER FOR OPERATIONS, FORMED ON 12 FEBRUARY 1944. ANDERSON DIRECTED THIS GROUP TO DETERMINE THE OPTIMUM AIR STRATEGY TO SUPPORT OVERLORD ONCE THE ALLIES HAD RENDERED THE LUFTWAFFE INEFFECTIVE.<sup>81</sup> THEIR REPORT OF 5 MARCH 1944 RECOMMENDED ATTACKS AGAINST THE PETROLEUM INDUSTRY, WITH A SPECIAL EMPHASIS ON GASOLINE. THE SPECIAL PLANNING COMMITTEE BASED THEIR JUDGMENTS ON ANALYSIS CONDUCTED BY THE ECONOMIC OBJECTIVES UNITS OF THE OFFICE OF STRATEGIC SERVICES, WHICH ESTIMATED THAT STRATEGIC BOMBING COULD DENY GERMANY 50% OF HER PETROLEUM. WHILE ACKNOWLEDGING THE IMPACT THAT THIS MIGHT HAVE ON GERMAN INDUSTRY, THE REPORT STATED THAT THIS WAS "NOT IMMEDIATELY OR DIRECTLY RELEVANT" TO THEIR RECOMMENDATION. INSTEAD, THE GROUP CHOSE PETROLEUM TARGETS DUE TO THEIR EFFECT ON THE EFFICIENCY AND MOBILITY OF THE TROOPS. IF THE OIL BOMBING OPERATION WERE TO HAVE AN IMPACT BEYOND THE FRONT, THE GROUP THOUGHT THE MOST LIKELY MECHANISM WOULD BE FOR GERMANY TO CAPITULATE DUE TO THE "GENERAL DECREASE IN CAPABILITY OF ALL GROUND FIGHTING FORCES."<sup>82</sup> IMMEDIATELY UPON RECEIVING THIS REPORT, ANDERSON WROTE TO AIR MARSHAL SIR DOUGLAS C. S. EVILL, PORTAL'S ASSISTANT IN THE COORDINATION OF THE CBO, REQUESTING "IMMEDIATE CLEARANCE BE GIVEN FOR THE EARLY ATTACK OF PLOESTI BY THE FIFTEENTH AIR FORCE."<sup>83</sup>

UNFORTUNATELY, THE USSTAF STRATEGIC ANALYSIS WAS ONLY ONE VOICE IN A HEATED DEBATE. AIR CHIEF MARSHAL SIR ARTHUR TEDDER, EISENHOWER'S DEPUTY, FAVORED AN ALTERNATIVE APPROACH. TEDDER FELT THAT DESTROYING FUEL PRODUCTION WOULD TAKE TOO LONG

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<sup>80</sup> MAJOR GENERAL F. L. ANDERSON, U.S.A., DEPUTY COMMANDER, OPERATIONS, UNITED STATES STRATEGIC AIR FORCES, MEMORANDUM TO AIR MARSHAL N.H. BOTTOMLEY, 22 JANUARY 1944, OPERATIONAL PLANNING: ATTACKS AGAINST OIL TARGETS FILE, BOX 143, THE PAPERS OF CARL SPAATZ; LIBRARY OF CONGRESS, WASHINGTON D.C.

<sup>81</sup> MAJOR GENERAL F. L. ANDERSON, U.S.A., DEPUTY COMMANDER, OPERATIONS, UNITED STATES STRATEGIC AIR FORCES, MEMORANDUM TO COLONEL WILLIAMSON, COL. HUGHES, COL. CABELL, COL. NAZARRO, LT. COL. BENDER, AND LT. COL. WRIGGLESWORTH, SUBJECT: PLANNING DIRECTIVE, 12 FEB 1944, AIR WAR PLANS FILE, BOX 67, THE PAPERS OF CARL SPAATZ; LIBRARY OF CONGRESS, WASHINGTON, D.C.

<sup>82</sup> COLONEL CHARLES G. WILLIAMSON, COLONEL RICHARD D. HUGHES, COLONEL CHARLES P. CABELL, COLONEL JOSEPH P. NAZARRO, LT. COL. FRANK P. BENDER, AND LT. COL. WILLIAM J. WRIGGLESWORTH, *PLAN FOR THE COMPLETION OF THE COMBINED BOMBER OFFENSIVE*, 5 MARCH 1944, AIR WAR PLANS FILE, BOX 67, THE PAPERS OF CARL SPAATZ, LIBRARY OF CONGRESS, WASHINGTON D.C., 2-3, PART 10; JOHN F. KREIS, ED., *PIERCING THE FOG: INTELLIGENCE AND ARMY AIR FORCE OPERATIONS IN WORLD WAR II* (WASHINGTON, D.C.: AIR FORCE HISTORY AND MUSEUMS PROGRAM, 1996), 208-212.

<sup>83</sup> MAJOR GENERAL F. L. ANDERSON, U.S.A., DEPUTY COMMANDER, OPERATIONS, UNITED STATES STRATEGIC AIR FORCES, MEMORANDUM TO AIR MARSHAL SIR DOUGLAS C.S. EVILL, 5 MARCH 1944, OPERATIONAL PLANNING: ATTACKS AGAINST OIL TARGETS FILE, BOX 143, THE PAPERS OF CARL SPAATZ, LIBRARY OF CONGRESS, WASHINGTON, D.C.; "DEFENSE OF NEW ZEALAND," NEW ZEALAND ELECTRONIC TEXT CENTRE, N.P., ON LINE, INTERNET, 12 MAY 2005, AVAILABLE FROM [HTTP://WWW.NZETC.ORG/TM/SCHOLARLY/TEI-WH2-3DOC-C7.HTML](http://www.nzetc.org/tm/scholarly/tei-WH2-3DOC-c7.html).

TO HAVE THE NECESSARY EFFECT. THEREFORE, HE CHAMPIONED STRIKES AGAINST RAIL, ROAD, AND RIVER TRANSPORTATION NETWORKS SO THAT GERMANY COULD NOT SUPPLY OR RAPIDLY REPOSITION HER LAND FORCES. TEDDER WON EISENHOWER'S SUPPORT, BUT SPAATZ CONTINUED TO PUSH THE USSTAF STRATEGY WHENEVER POSSIBLE. WITH EISENHOWER'S PERMISSION, SPAATZ ATTACKED OIL REFINERIES AS A PART OF HIS AIR SUPERIORITY CAMPAIGN. FURTHER, MANY OF HIS TRANSPORTATION PLAN ATTACKS COINCIDENTALLY HIT MARSHALLING YARDS THAT SERVICED OIL REFINERIES.

TO WHATEVER EXTENT EISENHOWER WOULD ALLOW, SPAATZ PLANNED TO ATTACK PLOESTI AS ONLY ONE PART OF A BROADER OIL OPERATION. NEARLY TWO YEARS OF COMBAT EXPERIENCE HAD CONVINCED THE AMERICANS THAT THEIR INITIAL THEORIES DEPICTING A SMALL NUMBER OF CRITICAL NODES WERE NAÏVE. IT HAD BECOME CLEAR THAT THE COA'S RELATIVELY PESSIMISTIC 1942 ASSESSMENT OF THE GERMAN PETROLEUM SYSTEM WAS CLOSER TO THE TRUTH THAN THE TIDAL WAVE STRATEGISTS HAD RECOGNIZED. IN PARTICULAR, AMERICAN INTELLIGENCE BECAME KEENLY AWARE OF GERMANY'S ABILITY TO SUPPLEMENT IMPORTED PETROLEUM WITH INDIGENOUS SYNTHETIC OIL PRODUCTION. THEREFORE, SPAATZ KNEW THAT ANY ATTACK AGAINST THE GERMAN OIL SYSTEM HAD TO HIT MULTIPLE TARGETS IN PARALLEL. AMERICAN COMBAT EXPERIENCE ALSO DEMONSTRATED THAT EVEN THE MOST SUCCESSFUL BOMBER RAIDS SELDOM PRODUCED PERMANENT EFFECTS. THE GERMANS PROVED ADEPT AT REPAIRING DAMAGE TO THEIR FACILITIES AND RESTORING OPERATIONS IN SHORT ORDER. THEREFORE, SPAATZ KNEW THAT HE COULD NOT TAKE THE KIND OF SINGLE-RAID RISKS THAT BRERETON HAD ASSUMED IN 1943. INSTEAD, SPAATZ HAD TO MAINTAIN THE FORCE STRUCTURE TO REVISIT IMPORTANT TARGETS TIME AND AGAIN. THUS PLOESTI WAS AGAIN TO PLAY A ROLE, ALTHOUGH A DIMINISHED ONE, IN AMERICAN AIR STRATEGY.

WHILE SPAATZ DICTATED THE STRATEGY, TWINING WAS RESPONSIBLE FOR FINDING TACTICS TO IMPROVE OVER TIDAL WAVE'S PERFORMANCE. NO COMMANDER WAS WILLING TO ACCEPT THE KIND OF LOSSES INCURRED ON THAT LOW-ALTITUDE ATTACK, WHERE THE VAST MAJORITY OF THE DAMAGE WAS CAUSED BY SMALLER CALIBER (20 AND 37 MM) ANTI-AIRCRAFT FIRE SURROUNDING THE TARGET. THEREFORE, FIFTEENTH AIR FORCE DECIDED TO RETURN THE SAFER AND MORE TRADITIONAL HIGH-ALTITUDE REGIME. PLOESTI WAS STILL A DANGEROUS PLACE EVEN AT THIS ALTITUDE, AS THE DEFENSES BRISTLED WITH 88MM HEAVY ANTI-AIRCRAFT GUNS. MOREOVER, FIFTEENTH AIR FORCE PLANNERS WERE AWARE THAT HIGH-ALTITUDE ATTACKS BROUGHT THE DRAWBACK OF DECREASED BOMBING ACCURACY. THIS WAS A PROBLEM IN EVEN THE BEST OF WEATHER, BUT A CRITICAL CONCERN IN THE PRESENCE OF INTERVENING CLOUDS. AMERICAN LEADERS HOPED THE NEW APS-15 "MICKEY" RADARS WOULD HELP ADDRESS THIS PROBLEM.

BUT, HIGH ALTITUDE TACTICS DID NOTHING TO PROTECT THE BOMBERS FROM ENEMY INTERCEPTORS. FORTUNATELY, OPERATIONS BY THE BOTH EIGHTH AND FIFTEENTH AIR FORCES DURING EARLY 1944 INDICATED THAT A SOLUTION WAS AT HAND. LONG-RANGE ESCORT FIGHTERS HAD DEMONSTRATED THE ABILITY TO KEEP THE GERMAN FIGHTERS AT BAY. WHILE THE ESCORTS COULD NOT PROVIDE COMPLETE PROTECTION, THEY BROKE UP INTERCEPTOR ATTACKS ENOUGH TO ALLOW THE B-

24s and B-17s to bomb accurately while suffering acceptable losses. Fifteenth Air Force was originally equipped with P-47s and P-38s. The P-47s proved unsuitable for escort missions from Italy due to their lack of range. The P-38s worked better, although performance deficiencies and engine supercharger problems limited their effectiveness as well. The P-51 proved to be the most effective of the escort fighters, and Fifteenth Air Force P-47 units began switching to the P-51 just as the command renewed attacks against Ploesti. Fighters were especially important since the defenses had grown. Allied intelligence estimated that the Germans and Romanians now maintained 225 to 250 fighters in Bucharest-Ploesti, with an additional hundred fighters ranged on the Sofia-Nis-Belgrade line.<sup>84</sup> American air strategists would soon discover that fighters could contribute to the fight against Ploesti in a variety of roles beyond bomber escort.<sup>85</sup>

The stage was set, therefore, for a return to Ploesti. The Americans had formed a new organization focused on strategic bombing and increased the force structure of this command to enable it to undertake the task. The leaders of USSTAF and Fifteenth Air Force had personally and professionally survived the rigors of combat and had taken the air war's lessons to heart. Spaatz had developed an air strategy with oil as the central theme, which he intended to execute to whatever extent he was allowed. Finally, Fifteenth Air Force was a more tactically refined organization, better prepared to combat the Luftwaffe than was Brereton's Ninth Air Force.

#### APRIL TO MAY – REFINERY MARSHALLING YARDS

In April 1944, Spaatz opened the USAAF's contribution to the Combined Bomber Offensive's transportation strategy. Spaatz interpreted his guidance very broadly, however, attacking railway marshalling yards that serviced oil refineries. Such attacks sometimes even damaged refineries themselves, as an Army Air Forces Evaluation Board explained: "The direction of flight...plus the compactness of the target area made bomb spillage in the refinery well nigh inevitable."<sup>86</sup> As operations progressed over the next six weeks, Spaatz sometimes received permission and sometimes used subterfuge to further deviate from the official CBO strategy.

The opening act of the marshalling yard attacks occurred on 5 April 1944. USSTAF directed nine B-24 groups, four B-17 groups, and fighter escorts to attack the Ploesti marshaling yards. The field order stated "The Ploesti [marshaling yard] is the key point in rail lines to Moldavia. Current tactical situation on the Russian front makes this

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<sup>84</sup> Army Air Force Evaluation Board, 11.

<sup>85</sup> Jay A. Stout, *Fortress Ploesti: The Campaign to Destroy Hitler's Oil* (Havertown, PA: Casemate, 2003), 102-103.

<sup>86</sup> Army Air Forces Evaluation Board, 4.

TARGET AN IMPORTANT AND ACTIVE COMMUNICATIONS CENTER FOR THE GERMAN ARMY.” YET A BOMBARDIER IN THE 450TH BOMB GROUP REMEMBERED IT “WAS OBVIOUS THAT THE AIMING POINT ON THE MARSHALING YARD WAS RIGHT NEXT TO A REFINERY AND LOADING STATION—AND THAT NO ONE WOULD BE UPSET IF THE WHOLE DAMNED PLACE WENT UP!” THE FORMATION ENCOUNTERED CLOUDS EN-ROUTE, WHICH FORCED THE FOUR TRAIL B-24 GROUPS TO RETURN TO BASE AND PREVENTED THE FIGHTER ESCORT FROM JOINING THE MAIN FORMATION. PRIOR TO THE TARGET, GERMAN AND ROMANIAN FIGHTERS ENGAGED THE 230 REMAINING BOMBERS, WITH IAR-81S MAKING FRONTAL FIRING PASSES WHILE ME-110S AND JU-88S FIRED ROCKETS FROM THE FLANKS. IN THE TARGET AREA, THE BOMBERS MET THE PREDICTED HEAVY ANTI-AIRCRAFT FIRE, BUT WERE SURPRISED BY THE EXTENSIVE SYSTEM OF SMOKE POTS THE GERMANS HAD INSTALLED TO OBSCURE THE REFINERIES.<sup>87</sup> HOWEVER, THE SMOKE SCREEN WAS NOT DENSE ENOUGH TO OBSCURE THE MARSHALING YARD. OF THE 588 TONS OF BOMBS AIMED AT THE RAIL FACILITIES, SIXTEEN BOMBS SPILLED INTO THE STANDARD REFINERY, SHUTTING DOWN THE DISTILLATION UNIT AND CRACKING UNIT FOR APPROXIMATELY TWO WEEKS. A FEW BOMBS ALSO CAUSED SOME SLIGHT DAMAGE TO THE TANKS AT THE CONCORDIA VEGA REFINERY.<sup>88</sup> IN RETURN, FIFTEENTH AIR FORCE LOST THIRTEEN BOMBERS.<sup>89</sup>

THE OTHER TWO APRIL ATTACKS, CONDUCTED ON THE FIFTEENTH AND TWENTY-FOURTH OF THE MONTH, USED VERY SIMILAR PLANS, WITH COMBINED STRIKES AGAINST THE CENTRAL ROMANIAN MARSHALING YARDS AT PLOESTI, BUCHAREST, AND NIS.<sup>90</sup> AGAIN, FIFTEENTH AIR FORCE TARGETED THE PLOESTI YARDS “IN THE EXPECTATION THAT MOST OF THE BOMBS WOULD PRODUCE ‘INCIDENTAL’ DAMAGE TO THE OIL REFINERIES.”<sup>91</sup> ON 15 APRIL, FIFTEENTH AIR FORCE PLANES STRUCK THE BUCHAREST AREA WITH 448 BOMBERS, OF WHICH THE LAST FIVE GROUPS WERE B-17S HITTING PLOESTI.<sup>92</sup> THE 137 BOMBERS FROM THE 5<sup>TH</sup> WING DROPPED WITH GOOD VISIBILITY THROUGH AN INEFFECTIVE SMOKE SCREEN.<sup>93</sup> THE GERMANS AND ROMANIANS LAUNCHED A STRONG DEFENSE OF 169 FIGHTERS, BUT THE GEOGRAPHICALLY SPLIT ATTACK AND EFFECTIVE P-38 ESCORT RESULTED IN ONLY TEN INTERCEPTS ON THE 5<sup>TH</sup> WING. OVERALL, THE WING LOST THREE B-17S ON THIS RAID.<sup>94</sup> NINE DAYS LATER, THE 5<sup>TH</sup> WING, NOW JOINED BY 47<sup>TH</sup> BOMB WING B-24S, LED THE FORMATION INTO ROMANIA. THE RECEPTION WAS HOTTER FOR THESE PLOESTI RAIDERS, AS THE INTERCEPTORS CHARACTERISTICALLY CONCENTRATED ON THE LEAD GROUPS.<sup>95</sup> ADDITIONALLY, THE COTTONTAILS OF THE 450TH BOMB

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<sup>87</sup> *Air Battle of Ploesti*, 6-7, Stout, 99-102.

<sup>88</sup> Army Air Forces Evaluation Board, Appendix A, 11.

<sup>89</sup> *Air Battle of Ploesti*, 7.

<sup>90</sup> *AIR BATTLE OF PLOESTI*, 9, 12.

<sup>91</sup> Craven and Cate, vol. 3, 174.

<sup>92</sup> OFFICE OF AIR FORCE HISTORY, “ARMY AIR FORCE WWII CHRONOLOGY, APRIL 1944,” N.P., ON-LINE, INTERNET, 18 APRIL 2005, AVAILABLE FROM [HTTP://WWW.AIRFORCEHISTORY.HQ.AF.MIL/POP TOPICS/CHRON/44APR.HTM](http://www.airforcehistory.hq.af.mil/PopTopics/Chron/44Apr.htm).

<sup>93</sup> Stout, 239.

<sup>94</sup> *Air Battle of Ploesti*, 10; “450 BG S2 Mission Report: 15 April 1944” n.p., online, Internet, 2 February 2005, available from <http://www.450thbg.com/real/s2/1944/april.shtml#Top>.

<sup>95</sup> *Air Battle of Ploesti*, 12-13.

GROUP REPORTED PARTICULARLY HEAVY DAMAGE FROM ANTI-AIRCRAFT FIRE.<sup>96</sup> IN SPITE OF THIS, THE 290 BOMBERS DROPPED VISUALLY, ALTHOUGH THE SMOKE SCREEN WAS PARTIALLY EFFECTIVE FOR THE FIRST TIME.<sup>97</sup> VISIBILITY WAS GOOD ENOUGH TO SEE SOME OF THE RESULTS, AS THE 450TH BOMB GROUP REPORTED A HEAVY CONCENTRATION OF BOMBS ON THE CONCORDIA VEGA REFINERY.<sup>98</sup> TRUE TO THE CREW REPORTS, THE ROMANIANS REPORTED SEVERE DAMAGE TO THIS REFINERY, WITH SOME OPERATIONS NEVER RESUMING.<sup>99</sup>

FIFTEENTH AIR FORCE CONDUCTED THE LAST ATTACKS AGAINST THE PLOESTI MARSHALING YARDS ON 5 AND 6 MAY 1944. THE ATTACK OF 5 MAY WAS THE LARGEST EFFORT AGAINST THE YARDS, WITH 166 B-17S AND 319 B-24S BOMBING WHILE 195 P-38S AND P-51S FOUGHT ROMANIAN AND GERMAN FIGHTERS.<sup>100</sup> FLAK WAS PARTICULARLY HEAVY ON THIS MISSION, PROVIDING AMPLE EVIDENCE THAT THE GERMANS HAD NEARLY DOUBLED THE NUMBER OF ANTI-AIRCRAFT GUNS AROUND PLOESTI. THIS GROUND-BASED FIRE WAS MOSTLY RESPONSIBLE FOR THE EIGHTEEN BOMBERS AND TWO FIGHTERS LOST.<sup>101</sup> PART OF THE EFFECTIVENESS OF THE GERMAN GROUND FIRE WAS DUE TO THEIR THISTLE AIRPLANES. THESE WERE CAPTURED AMERICAN AIRCRAFT THAT THE GERMANS RECONDITIONED AND THEN USED TO SHADOW AMERICAN FORMATIONS, REPORTING COURSE, TIMING, AND ALTITUDE.<sup>102</sup> THE RAF JOINED THE FIGHT THAT NIGHT, WITH 205 GROUP SENDING THIRTY-EIGHT WELLINGTONS AND FIVE HALIFAXES AGAINST THE MARSHALING YARDS AT CAMPINA. THIS FORCE LOST FIVE BOMBERS IN THE PRESENCE OF ACTIVE NIGHT FIGHTER DEFENSES.<sup>103</sup> FIFTEENTH AIR FORCE, IN TURN, SENT A RELATIVELY SMALL RAID OUT THE NEXT MORNING, CONSISTING OF 135 B-24S FROM THE 304<sup>TH</sup> BOMB WING, OF WHICH SIX WERE LOST. THIS MAJOR TWO-DAY MAAF EFFORT PAID DIVIDENDS, AS THE STEAUA ROMANA CENTRAL PUMP HOUSE AND OTHER FACILITIES WERE DESTROYED, PERMANENTLY SUSPENDING OPERATIONS. LIKEWISE, THE ASTRO-ROMANA REFINERY SUFFERED 241 BOMB HITS AND REQUIRED TWO MONTHS TO REGAIN 75% CAPACITY. THE STANDARD REFINERY SUSTAINED FORTY-ONE BOMB HITS, INTERRUPTING CRACKING FOR TWENTY-SIX DAYS. THE CONCORDIA VEGA AND COLOMBIA REFINERIES ENDURED LESS EXTENSIVE DAMAGE.<sup>104</sup>

IT IS IRONIC THAT THESE ATTACKS AGAIN TARGETED THE MARSHALING YARDS, SINCE SPAATZ FOR THE FIRST TIME HAD TENTATIVE PERMISSION TO BOMB THE REFINERIES. EISENHOWER'S DIRECTIVE OF 17 APRIL GAVE THE DESTRUCTION OF THE LUFTWAFFE AS USSTAF'S FIRST PRIORITY. SPAATZ ARGUED THAT THE ONLY WAY TO ACCOMPLISH THIS WAS TO FORCE THE LUFTWAFFE TO FIGHT, AND THAT

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<sup>96</sup> "450 BG S2 Mission Report: 24 April 1944" n.p., online, Internet, 2 February 2005, available from <http://www.450thbg.com/real/s2/1944/april.shtml#Top>.

<sup>97</sup> *Air Battle of Ploesti*, 13.

<sup>98</sup> "450 BG S2 Mission Report: 24 April 1944" n.p., online, Internet, 2 February 2005, available from <http://www.450thbg.com/real/s2/1944/april.shtml#Top>.

<sup>99</sup> Army Air Force Evaluation Board, Appendix A, 11.

<sup>100</sup> *Air Battle of Ploesti*, 16.

<sup>101</sup> Stout, 108-115.

<sup>102</sup> Army Air Forces Evaluation Board, Appendix B, vi.

<sup>103</sup> *Air Battle of Ploesti*, 17.

<sup>104</sup> Army Air Forces Evaluation Board, Appendix A, 11, 20.

THEY WOULD ONLY DO THIS IN DEFENSE OF THEIR FUEL. THEREFORE, EISENHOWER APPROVED ATTACKS AGAINST REFINERIES AS AN EXPERIMENT ON THE NEXT TWO GOOD WEATHER DAYS.<sup>105</sup> TEDDER ALSO YIELDED SOMEWHAT. ON 3 MAY, HE STATED "THE ONLY REASON FOR NOT ADDING OIL INSTALLATIONS AT PLOESTI TO LIST OF BOMBING TARGETS IN SOUTH EASTERN EUROPE WAS THAT OTHER TARGETS (E.G. BALKANS CAPITALS AND SUBSEQUENTLY COMMUNICATIONS) HAVE FOR STRATEGICAL REASONS BEEN MORE PROFITABLE. AS I SAID IN COSMED 68 I HAVE NO DESIRE TO FETTER CHOICE OF TARGETS WHICH MAY BE DESIRABLE FOR TACTICAL REASONS AND I ENTIRELY AGREE THAT SPAATZ SHOULD BE FREE TO COMBINE ATTACKS ON THE OIL REFINERIES WITH ATTACKS ON COMMUNICATIONS AT PLOESTI."<sup>106</sup> EVEN WITH TEDDER'S APPROVAL, SPAATZ APPARENTLY DID NOT WANT TO SPEND ONE OF HIS PRECIOUS EXPERIMENTAL STRIKES ON PLOESTI UNTIL THE WEATHER WOULD ALSO ALLOW THE LARGER EIGHTH AIR FORCE TO ATTACK SYNTHETIC REFINERIES THROUGHOUT GERMANY.

THE 18 AND 26 MAY PLOESTI ATTACKS, THEREFORE, MARKED THE OFFICIAL OPENING OF THE OIL CAMPAIGN IN THE MEDITERRANEAN. AFTER AN ABORTED ATTEMPT ON 21 APRIL, SPAATZ FINALLY FLEW HIS EXPERIMENTAL MISSION FROM ENGLAND ON 12 MAY WHEN NEARLY A THOUSAND EIGHTH AIR FORCE BOMBERS ATTACKED SYNTHETIC OIL REFINERIES IN GERMANY. AS SPAATZ PREDICTED, THE LUFTWAFFE VIGOROUSLY DEFENDED THESE FACILITIES, LOSING AT LEAST SIXTY FIGHTERS AND SUFFERING MAJOR REFINERY DAMAGE.<sup>107</sup> WITH THE SUCCESS OF THIS EXPERIMENT, OIL REFINERIES BECAME THE PRIMARY TARGET OF USSTAF BOMBERS. THE 18 MAY MISSION WAS DESIGNED TO KNOCK PLOESTI OUT OF THE WAR. FIFTEENTH AIR FORCE LAUNCHED 700 BOMBERS AGAINST SIX REFINERIES.<sup>108</sup> THE MISSION QUICKLY UNRAVELED DUE POOR WEATHER, HOWEVER, AND ONLY 206 B-17S AND B-24S FROM THE 5<sup>TH</sup>, 55<sup>TH</sup>, AND 304<sup>TH</sup> BOMB WINGS BOMBED THE ROMANA AMERICANA, CONCORDIA VEGA, AND REDEVENTA REFINERIES. FOR THE FIRST TIME, THE GERMAN SMOKE SCREEN WAS THICK ENOUGH TO OBSCURE COMPLETELY THE DESIGNATED AIM POINTS.<sup>109</sup> THE BOMBARDIERS DROPPED BY EITHER OFFSET AIMING TECHNIQUES, FOLLOWING PATHFINDER RADAR LEADS, OR ESTIMATING THE POSITION OF THE TARGETS FROM THE VISUAL REFERENCES THEY COULD SEE.<sup>110</sup> THE DAMAGE TO THE REFINERIES WAS EMBARRASSINGLY SMALL, WITH ONLY EIGHT BOMBS LANDING IN THE ROMANA AMERICANA COMPLEX BUT CAUSING NO DAMAGE.<sup>111</sup> MEANWHILE, FIGHTER AND FLAK DOWNED FOURTEEN AMERICAN BOMBERS.

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<sup>105</sup> Craven and Cate, vol. 3, 175.

<sup>106</sup> Air Ministry, message to HQ MAAF (R) MAAF Algiers, 3 May 1944, Operational Planning: Attacks against Oil Targets file, box 143, the Papers of Carl Spaatz, Library of Congress, Washington D.C.

<sup>107</sup> Craven and Cate, vol. 3, 176-177; Robert A. Doughty, Ira D. Gruber, Roy K. Flint, Mark Grimsley, George C. Herring, Donald D. Howard, John A. Lynn, and Williamson Murray, *Warfare in the Western World. Vol. 2: Military Operations Since 1871* (Lexington, MA: D.C. Heath and Company, 1996), 779.

<sup>108</sup> Stout, 126.

<sup>109</sup> *Air Battle of Ploesti*, 24; Craven and Cate, vol. 3, 177.

<sup>110</sup> *AIR BATTLE OF PLOESTI*, 24; WILLIAM R. CUBBINS, *THE WAR OF THE COTTON-TAILS: A BOMBER PILOT WITH THE FIFTEENTH AIR FORCE AGAINST NAZI GERMANY* (CHAPEL HILL, NC: ALGONQUIN BOOKS, 1989), 17-27.

<sup>111</sup> Army Air Forces Evaluation Board, Appendix A, 17.

THE RAF JOINED THE OIL CAMPAIGN ON THE NIGHT OF 26 MAY, BOMBING THE ROMANA AMERICANA REFINERY WITH SEVENTY-FOUR AIRCRAFT.<sup>112</sup>

FIFTEENTH AIR FORCE FLEW TWO ADDITIONAL PLOESTI MISSIONS IN PREPARATION FOR OVERLORD, ONE ON 31 MAY AND ONE ON THE MORNING OF D-DAY ITSELF. BY NOW, THE OIL CAMPAIGN WAS IN FULL SWING, WITH TWO LARGE EIGHTH AIR FORCE MISSIONS ON 28 AND 29 MAY.<sup>113</sup> ON 31 MAY, 481 BOMBERS FROM THE 5TH, 47TH, 49TH, 55TH, AND 304TH BOMB WINGS ATTACKED THE XENIA, ROMANA AMERICANA, CONCORDIA VEGA, REDEVENTA, AND UNIREA REFINERIES. AGAIN, THE CREWS REPORTED THAT THE SMOKE SCREEN WAS EFFECTIVE, YET THE BOMBING RESULTS WERE SURPRISINGLY GOOD. CONCORDIA VEGA ABSORBED 156 BOMBS, WHICH DESTROYED THE BOILER-HOUSE AND SHUT DOWN ALL OPERATIONS UNTIL 16 JUNE. THIRTY-SEVEN BOMBS HIT THE ROMANA AMERICANA REFINERY, DAMAGING THE BOILER HOUSE WHICH LIMITED OPERATIONS FOR OVER A MONTH. FINALLY, THE STANDARD REFINERY SUFFERED MODERATE DAMAGE FROM FIRES.<sup>114</sup> FIFTEENTH AIR FORCE LOST SIXTEEN BOMBERS ON THIS DAY, MANY TO THE 122 ROMANIAN AND GERMAN FIGHTER SORTIES.<sup>115</sup> WHEN FIFTEENTH AIR FORCE RETURNED TO THE ATTACK THE FOLLOWING WEEK, THEREFORE, THEY MADE A CONSCIOUS ATTEMPT TO SPREAD THE FIGHTER DEFENSES WITH GEOGRAPHICALLY DISPERSED ATTACKS. WHILE B-17S SHUTTLING FROM RUSSIA BOMBED THE GALATI AIRDROME, SIX OTHER GROUPS STRUCK COMMUNICATIONS AND TRANSPORTATION TARGETS THROUGHOUT ROMANIA. ALL OF THIS WAS TO PROTECT THE MAIN ATTACK FORCE OF ELEVEN B-24 GROUPS BOMBING THE ROMANA AMERICANA, XENIA, AND DACIA REFINERIES. IN ADDITION TO THE REFINERY STRIKES, FIFTEENTH AIR FORCE ATTACKED THE OIL DISTRIBUTION SYSTEM FOR THE FIRST TIME, HITTING THE OIL STORAGE, LOADING QUAY, AND TRAIN FERRY AT GIURGIU ON THE DANUBE. THE GERMANS AND ROMANIANS LAUNCHED 123 FIGHTER SORTIES, RESULTING IN NINETY-FIVE ENGAGEMENTS AND FOURTEEN DOWNED B-24s.<sup>116</sup> THE BOMBARDIERS STRUGGLED WITH ANOTHER EFFECTIVE SMOKE SCREEN OVER THE TARGET, CAUSING ONLY SLIGHT DAMAGE TO THE ASTRO ROMANA AND ROMANA AMERICANA REFINERIES.<sup>117</sup>

BETWEEN APRIL AND THE BEGINNING OF JUNE 1944, FIFTEENTH AIR FORCE AND 205 GROUP STRUCK PLOESTI TEN TIMES. IN DOING SO, THEY FULFILLED SPAATZ EXPECTATIONS BY DISRUPTING THE FLOW OF OIL TO THE GERMAN AIR FORCE WHILE ATTRITTING AXIS INTERCEPTORS IN THE PROCESS. HOWEVER, THE ALLIES SEEMED TO BE AT A POINT OF DIMINISHING RETURNS. THE HEAVY INTERCEPTOR AND ANTI-AIRCRAFT DEFENSES PROTECTING PLOESTI WERE TAKING AN INCREASING TOLL OF BOMBERS, WHILE THE GERMAN SMOKE SCREENS WERE HAMPERING ACCURACY. AS THE HEAVY BOMBERS TURNED TO REFINERIES ELSEWHERE IN EUROPE FOR SEVERAL WEEKS, FIFTEENTH AIR FORCE PLANNERS LOOKED FOR NEW SOLUTIONS FOR THIS TOUGH TARGET.

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<sup>112</sup> *Air Battle of Ploesti*, 25.

<sup>113</sup> Craven and Cate, vol. 3, 178.

<sup>114</sup> Army Air Force Evaluation Board, Appendix A, 7,11,13,17.

<sup>115</sup> *Air Battle of Ploesti*, 28.

<sup>116</sup> *Air Battle of Ploesti*, 30-31.

<sup>117</sup> Stout, 145; Army Air Force Evaluation Board, Appendix A, 4, 17.



## THE LIGHTNING RAID

IN AN EFFORT TO SOLVE THESE PROBLEMS, FIFTEENTH AIR FORCE PLANERS SETTLED ON A NOVEL CONCEPT. INSTEAD OF USING HEAVY BOMBERS TO ATTACK PLOESTI, THEY RAIDED WITH A FORCE OF FIGHTER BOMBERS. FOR A TARGET, FIFTEENTH AIR FORCE CHOSE THE ROMANA AMERICANA REFINERY, WHICH INTELLIGENCE ESTIMATED WAS STILL PRODUCING AS MUCH AS 15% OF THE AXIS FUEL SUPPLY IN SPITE OF RECENT BOMBING. PLANNERS HOPED THAT THE FIGHTERS COULD ACHIEVE TACTICAL SURPRISE, WHICH WOULD NOT ALLOW THE GERMANS ENOUGH TIME TO GENERATE A SMOKE SCREEN OVER THE REFINERIES. EVEN IF THE FIGHTERS DID NOT ACHIEVE SURPRISE, PLANNERS HOPED THAT THE LOW-ALTITUDE, DIVE-BOMBING FIGHTERS COULD STILL SEE THEIR TARGETS IN THE SMOKE. NO ONE CONSIDERED EMPLOYING BOMBERS AT LOW ALTITUDE AFTER THE TIDAL WAVE ATTACK, BUT PLANNERS HOPED THE SMALLER, FASTER, MORE MANEUVERABLE FIGHTERS WOULD BE MORE SURVIVABLE.<sup>118</sup>

THE FIGHTER GROUPS PLANNED THE MISSION QUICKLY, AS THEY RECEIVED THE ASSIGNMENT ONLY THE DAY PRIOR TO THE OPERATION. TWO P-38 GROUPS WERE INVOLVED. THE 82<sup>ND</sup> FIGHTER GROUP, CONSISTING OF THE 95<sup>TH</sup>, 96<sup>TH</sup>, AND 97<sup>TH</sup> FIGHTER SQUADRONS, BOMBED, WHILE THE 1<sup>ST</sup> FIGHTER GROUP, CONSISTING OF THE 27<sup>TH</sup>, 71<sup>ST</sup>, AND 94<sup>TH</sup> FIGHTER SQUADRONS, PROVIDED ESCORT. MISSION PLANNERS FROM THE TWO GROUPS SELECTED A ROUTE AND RENDEZVOUS PROCEDURES THAT PROMISED TO “EFFECT [SIC] THE MAXIMUM SURPRISE AND RECEIVE MINIMUM REACTION FROM THE HUNDREDS OF ANTI-AIRCRAFT GUNS IN THE AREA.” THE 82<sup>ND</sup> FIGHTER GROUP PILOTS STUDIED THEIR AIM POINTS – THE DISTILLATION PLANT FOR THE 95<sup>TH</sup> FIGHTER SQUADRON, THE BOILER HOUSE FOR THE 96<sup>TH</sup> FIGHTER SQUADRON, AND THE CRACKING PLANT FOR THE 97<sup>TH</sup> FIGHTER SQUADRON.<sup>119</sup> MEANWHILE, MAINTENANCE CREWS LOADED EACH OF THE 82<sup>ND</sup> FIGHTER GROUP P-38S WITH A SINGLE 1,000 LB BOMB AND A 300-GALLON, LONG-RANGE FERRY TANK.<sup>120</sup>

PLANES FROM BOTH GROUPS TOOK OFF AT DAWN AND RENDEZVOUSED OVER THE GULF OF MANFREDONIA AT 2,000 FEET. SEVENTEEN OF THE NINETY-FOUR P-38S ABORTED, MOST DUE TO ENGINE PROBLEMS, WHILE ANOTHER AIRCRAFT CRASHED IN YUGOSLAVIA. THE REST OF THE FORMATION CONTINUED THE THREE-HOUR, LOW-LEVEL FLIGHT ACROSS YUGOSLAVIA, BULGARIA, AND DOWN THE DANUBE INTO ROMANIA. UNFORTUNATELY, THE GERMANS AND ROMANIANS WERE WELL AWARE OF THE AMERICANS’ PRESENCE, DETECTING THEM WITH RADAR AND AIR OBSERVERS. AS WITH THE TIDAL WAVE MISSION, THE EFFICIENT AIR DEFENSE SYSTEM BROUGHT FIGHTER AND ANTI-AIRCRAFT UNITS TO READINESS AND PROVIDED AIR RAID WARNINGS WELL BEFORE THE AMERICANS NEARED THE VITAL REFINERIES.<sup>121</sup>

THE READINESS OF THE DEFENDING FORCES BECAME OBVIOUS JUST NORTH OF THE INITIAL POINT AT THE EASTERN END OF LAKE BALTA GREACO. THE TURN TO THE TARGET BADLY SPLIT THE

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<sup>118</sup> Stout, 152.

<sup>119</sup> Army Air Force Evaluation Board, Appendix E.

<sup>120</sup> Stout, 152-155.

<sup>121</sup> Stout, 155-157.

UNGAINLY P-38 FORMATION, AND THE PROBLEM GREW AS THE 71<sup>ST</sup> FIGHTER SQUADRON ENGAGED SIX DO-217S THEY ENCOUNTERED ALONG THE ROUTE. THE 71<sup>ST</sup> P-38S WERE UNPREPARED, THEREFORE, WHEN TWENTY-THREE IAR-81S FROM THE ROMANIAN 6<sup>TH</sup> FIGHTER GROUP ATTACKED. IN A CHAOTIC LOW-ALTITUDE ENGAGEMENT NEAR THEIR AIRFIELD, THE ROMANIANS DOWNED NINE 1<sup>ST</sup> FIGHTER GROUP P-38S TO THE LOSS OF THREE IARS. THIS STARTED A RUNNING ENGAGEMENT IN WHICH A MIXED BAG OF GERMAN AND ROMANIAN AIRCRAFT INTERCEPTED THE 82<sup>ND</sup> FIGHTER GROUP AND THE OTHER SQUADRONS OF THE 1<sup>ST</sup> FIGHTER GROUP.<sup>122</sup>

WHEN THE 82<sup>ND</sup> FIGHTER GROUP REACHED THE TARGET AREA, THE SMOKE SCREEN WAS ALREADY THICK. HOWEVER, TWENTY-FIVE OF THE THIRTY-EIGHT BOMB-LADEN P-38S BOMBED IN THE REFINERY AREA, WITH MANY MANEUVERING TO ALTERNATE RUN-IN HEADINGS OR USING SURROUNDING VISUAL REFERENCES TO AIM. THE PILOTS HAD DIFFICULTY ASCERTAINING THEIR RESULTS, AS THE SMOKE MADE IT ALMOST IMPOSSIBLE TO SEE THE BOMBS HIT.<sup>123</sup> THE ANTI-AIRCRAFT FIRE WAS INTENSE, AND MANY AIRCRAFT LIMPED OFF OF THE TARGET RUN ON A SINGLE ENGINE. MANY OF THESE BATTLE-DAMAGED AIRCRAFT DID NOT SURVIVE THE ANTI-AIRCRAFT FIRE OFF TARGET, THE CONTINUED ATTACKS FROM GERMAN AND ROMANIAN INTERCEPTORS, AND THE LONG FLIGHT HOME OVER MOUNTAINOUS TERRITORY.<sup>124</sup>

ALTHOUGH INNOVATIVE, THE MISSION COULD HARDLY BE CLASSIFIED AS A SUCCESS. THE 1<sup>ST</sup> FIGHTER GROUP LOST FOURTEEN AIRCRAFT, WHILE THE 82<sup>ND</sup> LOST NINE. OVERALL, THE LOSS RATIO, APPROXIMATELY 30%, WAS SIMILAR TO THE TIDAL WAVE ATTACK. THIS PERMANENTLY DISPELLED THE MYTH THAT LOW-ALTITUDE OPERATIONS OVER PLOESTI WERE ACCEPTABLE FOR ANY AIRCRAFT. INDEED, ROMANIAN ANTI-AIRCRAFT CREWS LATER CLAIMED THAT THEY RELISHED THE LOW-LEVEL ATTACKS AS AN OPPORTUNITY TO "BOLSTER THEIR SCORE."<sup>125</sup> THIS WAS THE WORST DAY IN COMBAT FOR BOTH FIGHTER GROUPS AND FOR ANY P-38 FORMATION OF SIGNIFICANT SIZE DURING THE WAR. THE ONLY CONSOLATION WAS THAT THE LOSS OF SINGLE-SEAT FIGHTERS INCURRED A FAR SMALLER HUMAN TOLL THAN THE NINTH AIR FORCE ATTACK OF THE PREVIOUS YEAR. THE BOMBING RESULTS HARDLY JUSTIFIED THE COSTS. THE FIGHTER PILOTS DAMAGED ONLY THE SHELL STILL FACILITY, PUTTING IT OUT OF SERVICE FOR EIGHT DAYS.<sup>126</sup> RATHER THAN KNOCKING THE REFINERY OUT OF THE WAR, THE AMERICANS JUST ADDED TO THEIR OWN CUMULATIVE ATTRITION.<sup>127</sup>

#### SLUGGING IT OUT – THE SUMMER BOMBING RAIDS

ALLIED INTELLIGENCE RECEIVED MORE INDICATIONS OF GERMANY'S DETERIORATING FUEL SITUATION IN EARLY JUNE 1944. BECAUSE OF THIS, SPAATZ DECLARED ON 8 JUNE THAT USSTAF'S

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<sup>122</sup> Stout, 158-162.

<sup>123</sup> Army Air Force Evaluation Board, Appendix E.

<sup>124</sup> Stout, 162-166.

<sup>125</sup> Army Air Force Evaluation Board, 50.

<sup>126</sup> Army Air Force Evaluation Board, Appendix A, 17.

<sup>127</sup> Stout, 167.

PRIMARY AIM WAS TO DENY OIL TO GERMANY'S ARMED FORCES. IN A DIRECTIVE TO GENERAL EAKER ON THAT DATE, SPAATZ ADDED THAT "FIFTEENTH AIR FORCE WAS TO HAVE AS ITS FIRST PRIORITY THE COMPLETE DESTRUCTION OF THE RUMANIAN OIL REFINERIES."<sup>128</sup> TO THIS POINT, FIFTEENTH AIR FORCE HAD INFLICTED AT LEAST PARTIAL DAMAGE ON TWENTY-NINE OF THE SIXTY-ODD REFINERIES IN SOUTHERN AND EASTERN EUROPE.<sup>129</sup> HOWEVER, THE GERMANS WERE EXPENDING TREMENDOUS RESOURCES TO KEEP THEIR REFINERIES IN WORKING ORDER. IN THE COMING MONTHS, MAAF FLEW THIRTEEN MORE MISSIONS AGAINST PLOESTI BEFORE THE SOVIETS CAPTURED THE FACILITY. IN THE END, USSTAF, WITH A SOUND STRATEGY AND LAVISH MATERIAL RESOURCES, WON THE LAST CHAPTER IN THE PLOESTI SAGA.

THREE OF FIFTEENTH AIR FORCE'S OIL STRIKES TARGETED PLOESTI DURING LATE JUNE AND EARLY JULY 1944. ON 23 JUNE, FIFTEENTH AIR FORCE DISPATCHED 761 BOMBERS IN A GEOGRAPHICALLY SPREAD ATTACK. OF THESE, FIFTEENTH AIR FORCE SORTIED TWO BOMB WINGS TO PLOESTI, WHILE SENDING FOUR MORE GROUPS AGAINST OIL STORAGE AT GIURGIU. POOR WEATHER FORCED THE 47<sup>TH</sup> BOMB WING TO ABORT, LEAVING THE 139 B-17S OF THE 5<sup>TH</sup> BOMB WING TO DROP INTO THE SMOKE COVERING PLOESTI'S DACIA REFINERY. SINCE THE BOMBING RESULTS WERE POOR, THE MOST SIGNIFICANT OUTCOME OF THIS RAID WAS THE ATTRITION ON THE ROMANIAN DEFENSES. AMERICAN FIGHTERS CLAIMED TO HAVE SHOT DOWN TWENTY-FOUR OF THE 198 INTERCEPTOR SORTIES LAUNCHED THAT DAY, KILLING TWO OF ROMANIA'S FOUR FIGHTER GROUP COMMANDERS IN THE PROCESS.<sup>130</sup> THE NEXT DAY, FIFTEENTH AIR FORCE SENT THE 47<sup>TH</sup> BOMB WING BACK TO PLOESTI TO ATTACK THE ROMANA AMERICANA REFINERY. AGAIN, THE FORMATION BOMBED THROUGH THE SMOKE, WITH FORTY-TWO BOMBS DAMAGING PIPELINE AND SEWER FACILITIES, WHICH INTERRUPTED OPERATIONS FOR FIVE DAYS.<sup>131</sup> IN THE PROCESS, HOWEVER, THE 47<sup>TH</sup> BOMB WING LOST A STARTLING FOURTEEN OF 135 BOMBERS, MANY TO THE 161 AXIS FIGHTERS AIRBORNE. AFTER THIS, XV FIGHTER COMMAND BEGAN AIRFIELD ATTACKS AND FIGHTER SWEEPS TO BEAT BACK THE AIR THREAT.<sup>132</sup> THIS APPARENTLY HAD A POSITIVE EFFECT. FIFTEENTH AIR FORCE ESTIMATED THAT THE INTERCEPTORS DOWNED FORTY-NINE BOMBERS BETWEEN 5 APRIL AND 24 JUNE, BUT ONLY TWO BOMBERS BETWEEN 9 JULY AND LATE AUGUST.<sup>133</sup> INDEED, THE DECREASED LOSS RATE WAS SUDDEN, WITH THE 5<sup>TH</sup> AND 47<sup>TH</sup> WINGS LOSING ONLY SIX OF 122 BOMBERS WHEN THEY BOMBED THE XENIA AND CONCORDIA VEGA REFINERIES ON 9 JULY.<sup>134</sup> ON THIS RAID, THE 47<sup>TH</sup> BOMB WING ACHIEVED SIXTY-EIGHT HITS ON THE LARGELY INOPERATIVE CONCORDIA VEGA REFINERY, WHILE THE 5<sup>TH</sup> BOMB WING MISSED XENIA ALTOGETHER.<sup>135</sup>

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<sup>128</sup> Army Air Force Evaluation Board, 4.

<sup>129</sup> Craven and Cate, vol. 3, 281.

<sup>130</sup> *Air Battle of Ploesti*, 36-37; Stout, 174; Craven and Cate, vol. 3, 283.

<sup>131</sup> Army Air Force Evaluation Board, Appendix A, 17.

<sup>132</sup> Stout, 174, 185-192.

<sup>133</sup> Army Air Forces Evaluation Board, 11.

<sup>134</sup> *Air Battle of Ploesti*, 42.

<sup>135</sup> Army Air Forces Evaluation Board, Appendix A, 12-13.

THE LARGEST RAID OF THE CAMPAIGN OCCURRED ON 15 JULY, FOLLOWED BY ANOTHER LARGE MISSION ONE WEEK LATER. ON THE 15 JULY RAID, ALL FIVE BOMB WINGS OF THE FIFTEENTH AIR FORCE PUT UP A MAXIMUM EFFORT, CONSISTING OF TWENTY-ONE GROUPS FLYING 604 AIRCRAFT. PLANNERS ASSIGNED THE HEARTY ROMANA AMERICANA REFINERY TO TEN OF THE GROUPS, SPREADING THE OTHERS BETWEEN THE CREDITUL, STANDARD, AND DACIA REFINERIES.<sup>136</sup> THIS MASSIVE FORCE BOMBED THROUGH THE SMOKE SCREEN USING H2X RADAR. THE RAID WAS ONLY PARTIALLY SUCCESSFUL, WITH 168 BOMBS LANDING IN THE ROMANA AMERICANA AREA. THE RESULTING FIRES AND DAMAGE TO THE SHELL STILL STOPPED OPERATIONS UNTIL 3 AUGUST.<sup>137</sup> ON 22 JULY, FIFTEENTH AIR FORCE, NOT REALIZING THE DAMAGE INFLICTED ON THE PREVIOUS RAID, ASSIGNED ROMANA AMERICANA TO ANOTHER 459 BOMBERS.<sup>138</sup> THE RAIDERS PUT ANOTHER FORTY-FIVE BOMBS INTO THE DAMAGED FACILITY, WHILE THE DEFENDERS SHOT BACK WITH 46,000 ROUNDS OF HEAVY ANTI-AIRCRAFT AMMUNITION. FIFTEENTH AIR FORCE LOST FORTY-SIX BOMBERS ON THESE TWO RAIDS, BUT ACHIEVED LESS THAN ONE BOMB HIT FOR EVERY FIVE AIRCRAFT ACROSS THE TARGET.<sup>139</sup>

USSTAF REFINED THE OIL CAMPAIGN STRATEGY DURING THE LAST TWO MISSIONS OF JULY. ON 28 JULY, 324 BOMBERS FROM THE 5<sup>TH</sup>, 49<sup>TH</sup>, 55<sup>TH</sup>, AND 304<sup>TH</sup> BOMB WINGS ATTACKED THE ASTRO ROMANA AND STANDARD REFINERIES. PLANNERS CAREFULLY PICKED THE AIM POINTS TO MAXIMIZE THE IMPACT ON GASOLINE PRODUCTION.<sup>140</sup> THIS WAS BASED ON THE RECOMMENDATION OF THE JOINT OIL TARGETS COMMITTEE, SET UP TO SUPERVISE THE OIL CAMPAIGN MORE SCIENTIFICALLY. FORTY-EIGHT AXIS FIGHTERS OPPOSED THE ATTACK; HOWEVER, THESE AIRCRAFT WERE HEAVILY ENGAGED BY THE ESCORT, WITH NO INTERCEPTORS ENGAGING THE BOMBERS.<sup>141</sup> SEVENTY-TWO BOMBS HIT THE ASTRO ROMANA REFINERY, CAUSING MINOR DAMAGE REQUIRING SEVERAL DAYS TO REPAIR.<sup>142</sup> FOR THIS, FIFTEENTH AIR FORCE LOST NINETEEN BOMBERS.<sup>143</sup> THE AMERICANS USED THE SAME TACTICS ON A RELATIVELY SMALL ATTACK ON THE XENIA REFINERY THREE DAYS LATER. ONE HUNDRED AND FIFTY-FOUR 154 B-17S FROM THE 5<sup>TH</sup> BOMB WING BOMBED PLOESTI WHILE OTHER BOMB GROUPS HIT TARGETS THROUGHOUT ROMANIA. THE FORTY-SEVEN AXIS FIGHTERS TOOK A TREMENDOUS POUNDING WHEN ATTEMPTING TO ENGAGE OTHER FORMATIONS.<sup>144</sup> THE GERMAN FIGHTER UNITS, WHICH HAD BEEN CONTINUALLY RECONSTITUTED WITH LESS AND LESS EXPERIENCED PILOTS, LOST 23 OF THEIR 32 AIRCRAFT ON THIS DAY.<sup>145</sup> EVEN AGAINST THIS LIGHT FIGHTER RESPONSE, THE PLOESTI RAIDERS LOST TWO AIRCRAFT WHILE GETTING ONLY TWENTY BOMB HITS ON THE INOPERATIVE CONCORDIA VEGA REFINERY. EVEN THOUGH THIS REFINERY WAS NOT THE ASSIGNED TARGET, THE BOMBERS ADDED

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<sup>136</sup> *Air Battle of Ploesti*, 45.

<sup>137</sup> Army Air Forces Evaluation Board, Appendix A, 18.

<sup>138</sup> *Air Battle of Ploesti*, 48; Stout, 201, 204.

<sup>139</sup> Army Air Force Evaluation Board, Appendix A, 18, Appendix B, iii.

<sup>140</sup> Stout, 213.

<sup>141</sup> *Air Battle of Ploesti*, 51.

<sup>142</sup> Army Air Force Evaluation Board, Appendix A, 4.

<sup>143</sup> *Air Battle of Ploesti*, 51.

<sup>144</sup> *Air Battle of Ploesti*, 54.

<sup>145</sup> Stout, 217.

DAMAGE TO THE BATTERIES.<sup>146</sup> IN ADDITION TO DROPPING BOMBS, FIFTEENTH AIR FORCE TOOK THIS OPPORTUNITY TO DELUGE THE COUNTRYSIDE WITH PAMPHLETS.<sup>147</sup>

THE NEXT WEEK, THE RAF AND USAAF HIT THE REFINERIES IN QUICK SUCCESSION. THE RAF LED OFF WITH AN ATTACK ON THE NIGHT OF 9 AUGUST, IN WHICH 205 GROUP SENT SIXTY-ONE WELLINGTONS, LIBERATORS, AND HALIFAXES. ANTI-AIRCRAFT FIRE AND EIGHT AXIS NIGHT FIGHTERS DESTROYED ELEVEN OF THESE BOMBERS, FOR A STAGGERING LOSS RATE OF 18%.<sup>148</sup> AMERICAN LOSSES WERE SIGNIFICANTLY LIGHTER THE NEXT MORNING, WHEN ALL FIVE OF THE FIFTEENTH AIR FORCE'S BOMB WINGS ATTACKED ROMANA AMERICANA, UNIREA, XENIA, ASTRO ROMANA, AND STEAU ROMANA REFINERIES WITH 414 AIRCRAFT. IN THIS RAID, FIFTEENTH AIR FORCE INTRODUCED A NOVEL USE FOR FIGHTER AIRCRAFT. A WEATHER RECONNAISSANCE P-38 PRECEDED THE BOMBER STREAM BY TWENTY MINUTES. THE FIGHTER THEN CONTACTED THE BOMBER WING COMMANDER FOR EACH FORMATION, INFORMING HIM OF THE WEATHER AT THE TARGET, THE DIRECTION OF THE GROUND WIND, AND THE EFFECTIVENESS OF THE SMOKE SCREEN. BASED ON THIS REPORT, THE BOMBER WING COMMANDER SWITCHED TO THE TARGET THAT PROVIDED THE BEST OPPORTUNITY FOR VISUAL BOMBING.<sup>149</sup> THIS TACTIC, COUPLED WITH A THINNING SMOKE SCREEN AT THE END OF THE RAID, MADE FOR DRAMATIC SUCCESS.<sup>150</sup> WHILE THE ASTRO ROMANA AND STANDARD REFINERIES RECEIVED ONLY MINOR DAMAGE, THE CONCORDIA VEGA REFINERY WAS HIT WITH 210 BOMBS, DAMAGING VIRTUALLY ALL THE FACILITIES AND HALTING PRODUCTION. STEAU ROMANA AND ROMANA AMERICANA, BOTH IDLE FROM RECENT DAMAGE, WERE BATTERED BY ANOTHER 164 BOMBS, TAKING BOTH FACILITIES OUT OF THE WAR. THE AXIS FIGHTER DEFENSES CONTINUED TO WEAKEN, WITH ONLY THREE OF THE FORTY-FIVE SORTIES AIRBORNE MAKING IT THROUGH THE FIGHTER ESCORT TO THE BOMBERS. FLAK MADE UP FOR THE DIFFERENCE, HOWEVER, DESTROYING SEVENTEEN BOMBERS.<sup>151</sup>

ALLIED FORCES FINISHED THE CAMPAIGN AGAINST PLOESTI WITH A FOUR-RAID FLOURISH BETWEEN 17 AND 19 AUGUST. BY THIS POINT, THE REFINERIES WERE LARGELY WRECKED, BUT THESE RAIDS ENSURED THAT THE GERMANS COULD NOT WITHDRAW MACHINERY OR FINISHED OIL PRODUCTS AS THEY RETREATED.<sup>152</sup> ON 17 AUGUST, 245 B-24S ATTACKED THE ROMANA AMERICANA AND ASTRO ROMANA PLANTS. FIFTEENTH AIR FORCE REFINED THE TACTICS THAT HAD PROVED SO SUCCESSFUL ON THE PREVIOUS RAID. THE ELEVEN BOMB GROUPS STRUCK IN THREE WAVES WITH THIRTY MINUTES BETWEEN WAVES, IN THE HOPE THAT THE SMOKE SCREEN WOULD DISSIPATE BEFORE THE END OF THE RAID. TO COVER THIS LONG BOMBER STREAM, THE 154<sup>TH</sup> WEATHER RECONNAISSANCE SQUADRON SORTIED THREE P-38S IN SUCCESSION. ON THIS RAID, THE AIR COMMANDERS FOR EACH WING WERE AUTHORIZED TO SWITCH TO ANY OF FIVE REFINERY TARGETS BASED ON THE REPORTS OF THE MASTER

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<sup>146</sup> Army Air Force Evaluation Board, Appendix A, 12-13.

<sup>147</sup> Craven and Cate, vol. 3, 292.

<sup>148</sup> *Air Battle of Ploesti*, 56.

<sup>149</sup> *Air Battle of Ploesti*, 57-58.

<sup>150</sup> Craven and Cate, vol. 3, 297.

<sup>151</sup> *Air Battle of Ploesti*, 58.

<sup>152</sup> Craven and Cate, vol. 3, 297.

BOMBER P-38.<sup>153</sup> USING THIS TACTIC, FIVE OF THE GROUPS DROPPED VISUALLY, DESTROYING ELECTRICAL GENERATING EQUIPMENT IN THE STANDARD REFINERY AND DAMAGING PRACTICALLY ALL OF THE ROMANA AMERICANA FACILITIES WITH 121 BOMBS.<sup>154</sup> FIFTY ENEMY FIGHTERS WERE AIRBORNE, OF WHICH FIFTEEN TO TWENTY ENGAGED THE BOMBERS NEAR NIS. FIGHTER ATTACKS AND ANTI-AIRCRAFT FIRE CLAIMED ANOTHER NINETEEN BOMBERS. THAT NIGHT, THE RAF'S 205 GROUP ATTACKED WITH FIFTY-ONE BOMBERS, WITH SOME OR ALL OF THE THREE LOSSES DUE TO JU-88 NIGHT FIGHTERS ATTACKING OVER THE DANUBE AND TARGET AREA.

THE NEXT MORNING, FIFTEENTH AIR FORCE RETURNED TO THE BOMBER STREAM TACTICS, BUT INCREASED THE NUMBER OF WEATHER RECONNAISSANCE P-38S AND REFINED COMMUNICATIONS PROCEDURES. ON THIS DAY, TWELVE BOMB GROUPS COMPRISING 373 AIRCRAFT HIT THE REFINERIES, WITH FOUR GROUPS BOMBING VISUALLY. THE BOMBERS HIT TWO INOPERATIVE REFINERIES, WITH SEVENTY-FOUR BOMBS ON STEAUA ROMANA AND 359 BOMBS ON ROMANA AMERICANA. THE GERMANS AND ROMANIANS LAUNCHED FORTY-SIX FIGHTERS, ALTHOUGH NONE MADE IT TO THE BOMBERS. THE LAST RAID OF THE OPERATION OCCURRED ON THE NEXT DAY, 19 AUGUST, WHEN SIXTY-FIVE BOMBERS FROM THE 5<sup>TH</sup> BOMB WING PUT SIXTY-FIVE BOMBS INTO THE ASTRO ROMANA REFINERY USING THE WEATHER-SHIP TACTIC. AT THE END OF THESE HEAVY-HITTING RAIDS, PLOESTI'S PRODUCTION DROPPED TO 10% OF ORIGINAL CAPACITY.<sup>155</sup>

OIL WORKERS STOPPED ALL OPERATIONS AT PLOESTI ON 24 AUGUST 1944. SOON THEREAFTER, RUSSIAN TROOPS OVER-RAN THE DEMOLISHED FACILITIES. THE RAIDS OF JUNE, JULY, AND AUGUST HAD SUCCESSFULLY CUT THE "TAPROOT OF GERMAN MIGHT." IN DOING SO, THEY CONTRIBUTED TO WIDER CAMPAIGN THAT DEPRIVED THE GERMAN ARMED FORCES OF THE FUEL REQUIRED TO COUNTER THE INVASION AND BREAK-OUT FROM NORMANDY. THE BOMBING OF PLOESTI, HOWEVER, WAS A BLOODY BATTLE OF ATTRITION THROUGH THE END.

## RESULTS AND ASSESSMENT

A CAREFUL LOOK AT THE TALLY-SHEET PROVIDES PERSPECTIVE ON THE EPIC AIR BATTLES OVER ROMANIA. STRATEGICALLY, THE ALLIES' ORIGINAL HIGH EXPECTATIONS WERE DASHED, YET SPAATZ EVENTUALLY FOUND A WAY TO LINK PLOESTI TO AN IMPORTANT AND ACCEPTED WAR-WINNING STRATEGY. TACTICALLY, HOWEVER, THE AAF NEVER FOUND CLEAR-CUT SOLUTIONS TO THE DIFFICULT PROBLEMS SURROUNDING THE REFINERY ATTACKS.

AT THE BEGINNING OF THE WAR, ROOKIE AMERICAN AIR STRATEGISTS HOPED THAT PLOESTI WOULD BE THE SILVER BULLET TO PROVE THE INDUSTRIAL WEB THEORY OF STRATEGIC BOMBING. THEY THOUGHT THIS TARGET COMPLEX WAS A PRIME EXAMPLE OF A KEY NODE TO AN ORGANIC SYSTEM, THE DESTRUCTION OF WHICH WOULD LEAD TO THE SYSTEMIC COLLAPSE OF THE GERMAN WAR ECONOMY.

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<sup>153</sup> *Air Battle of Ploesti*, 60.

<sup>154</sup> Army Air Forces Evaluation Board, 12, Appendix A, 7, 18.

<sup>155</sup> *Air Battle of Ploesti*, 61-68; Army Air Forces Evaluation Board, 12, Appendix A, 4, 15, 18.

GIVEN THIS OPINION, AIR STRATEGISTS WERE WILLING TO ACCEPT THE LOSS OF THE ENTIRE STRIKE FORCE. THE TIDAL WAVE ATTACK SHOWED THE FOLLY OF THIS REASONING. ALTHOUGH THE ATTACKS KNOCKED OUT TWO OF THE SMALLER REFINERIES FOR EXTENDED PERIODS AND TEMPORARILY DECREASED PRODUCTION IN THE OTHERS, THE GERMANS QUICKLY MADE THESE LOSSES GOOD THROUGH REPAIRS AND BY ACTIVATING IDLE CAPACITY. EVEN THIS SHORT TERM LOSS HAD NO SIGNIFICANT IMPACT ON GERMAN INDUSTRY, WHICH WAS LARGELY POWERED BY COAL.

IT TOOK SPAATZ'S OIL PLAN TO MAKE PLOESTI PART OF AN EFFECTIVE STRATEGY. SPAATZ SET HIS SIGHTS LOWER THAN THE GERMANY'S ECONOMIC COLLAPSE. INSTEAD, HE CALCULATED THAT A MASSIVE, SUSTAINED, PARALLEL CAMPAIGN AGAINST ALL GERMAN AND ROMANIAN OIL REFINERIES AND SYNTHETIC PRODUCTION PLANTS WOULD DEPRIVE THE AXIS MILITARY OF FUEL. ALTHOUGH PLOESTI WAS JUST A COMPONENT OF THIS BROAD STRATEGY, IT WAS AN IMPORTANT PIECE. FOURTEEN OF THE SIXTY-SIX OIL PLANTS ATTACKED DURING THE OPERATION WERE IN ROMANIA, AND THE RELATIVELY SMALL FIFTEENTH AIR FORCE CONDUCTED 58% OF USSTAF'S OIL CAMPAIGN SORTIES.<sup>156</sup> SPAATZ'S OIL PREDICTIONS TURNED OUT TO BE CORRECT. UNDER HEAVY SYSTEMIC ASSAULT, GERMAN PETROLEUM PRODUCTION DIMINISHED FROM 927,000 TONS IN MARCH, TO 715,000 TONS IN MAY, TO 472,000 TONS IN JUNE.<sup>157</sup> MUCH OF THIS LOSS CAME FROM PLOESTI, WHERE PRODUCTION TUMBLED FROM 269,000 TONS IN MARCH, TO 120,000 TONS IN MAY, TO 84,000 TONS IN AUGUST. WHILE IT FINALLY TOOK SOVIET OCCUPATION AT THE END OF AUGUST TO DRIVE PRODUCTION TO ZERO, THE SEVERE PRODUCTION DECLINE CLEARLY PRECEDED THE ENTRY OF SOVIET GROUND FORCES. OVERALL, PLOESTI'S LOST PRODUCTION CONSISTED OF 718,000 TONS OVER FIVE MONTHS, REPRESENTING A 56% REDUCTION IN CAPACITY.<sup>158</sup>

IN RESPONSE TO PRODUCTION SHORTAGES, THE GERMAN HIGH COMMAND CUT FUEL ALLOCATIONS AS EARLY AS MAY. AVIATION FUEL WAS THE MOST CRITICAL PETROLEUM PRODUCT, AS THE OIL CAMPAIGN KNOCKED OUT 90% OF HIGH-OCTANE GASOLINE PRODUCTION BY MID-JUNE AND 98% BY THE END OF JULY. BECAUSE OF THAT, GERMAN PILOT TRAINING WAS NEARLY IMPOSSIBLE AND THE OUTPUT OF THE FIGHTER FACTORIES WAS OFTEN GROUNDED. MOREOVER, GERMAN LAND FORCES WERE SEVERELY HAMPERED BY THE GASOLINE SHORTAGES: THE REICH'S DECEMBER 1944 ARDENNES OFFENSIVE STALLED DUE TO LACK OF FUEL AND THE FEBRUARY 1945 SILESIAN DEFENSE FAILED DUE TO LACK OF GASOLINE TO MANEUVER.<sup>159</sup> GENERAL ADOLPH GALLAND, THE CHIEF OF LUFTWAFFE FIGHTER FORCES, CONCLUDED AFTER THE WAR THAT THE "RAIDS OF THE ALLIED AIR FLEETS ON THE GERMAN PETROL SUPPLY INSTALLATIONS WAS THE MOST IMPORTANT OF THE COMBINED FACTORS WHICH

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<sup>156</sup>George C. McDonald, Brigadier General, U.S.A., Director of Intelligence, USSTAF, *An Evaluation of the Effects of the Bomber Offensive on 'Overlord' and 'Dragoon'*, 5 September 1944, Air War Plans file, box 67, the Papers of Carl Spaatz, Library of Congress, Washington D.C.

<sup>157</sup>Craven and Cate, vol. 3, 286.

<sup>158</sup>Army Air Force Evaluation Board, 18, Exhibit 3, Exhibit 19.

<sup>159</sup>ALBERT SPEER TO ADOLPH HITLER, TRANSLATION OF LETTER OUTLINING JUNE 1944 ARMAMENT AND WAR PRODUCTION TOTALS, 30 JUNE 1944, FILE 110.C.(17), SPEER LETTERS TO HITLER, EUROPEAN SURVEY GENERAL RECORDS, RECORDS OF THE U.S. STRATEGIC BOMBING SURVEY, RG 243, NATIONAL ARCHIVES AT COLLEGE PARK, COLLEGE PARK, MD, 1; DOUGHTY, ET AL, 779-780.

BROUGHT ABOUT THE COLLAPSE OF GERMANY.”<sup>160</sup> ALBERT SPEER, THE GERMAN MINISTER OF ARMAMENTS AND WAR PRODUCTION AND FIELD MARSHAL ERHARD MILCH, THE LUFTWAFFE INSPECTOR GENERAL, AGREED THAT OIL WAS THE KEY FACTOR CAUSING A DECISION IN THE WAR AND THE AMERICANS WOULD HAVE BEEN MORE EFFECTIVE IF THE OIL CAMPAIGN WERE CONDUCTED EARLIER.<sup>161</sup>

A NUMBER OF FACTORS CONTRIBUTED TO THE IMPROVED CORRELATION BETWEEN ENDS AND MEANS IN 1944. THE FIRST, OF COURSE, WAS ULTRA INTERCEPTS THAT GAVE USSTAF DETAILED KNOWLEDGE OF THE INTERNAL WORKINGS OF THE GERMAN MILITARY. SECOND, TWO YEARS OF COMBAT EXPERIENCE GAVE AMERICAN AIR STRATEGISTS A MORE REALISTIC VIEW OF THE CAPABILITIES AND LIMITATIONS OF STRATEGIC BOMBING. THIRD, THE JOINT OIL TARGETS COMMITTEE FOCUSED INTELLIGENCE ANALYSIS ON THIS ONE TARGET SYSTEM, IDENTIFYING THE KEY CRITICALITY OF GASOLINE TO GERMAN OPERATIONS. FINALLY, IT REQUIRED A COMMANDER WHO HAD GOOD INSTINCTS ABOUT WHAT INTELLIGENCE TO TRUST AND WHAT TO DISCARD. WHILE ULTIMATELY SUCCESSFUL, THE STRATEGIC DECISION MAKING IN 1944 WAS FAR FROM PERFECT. THE MOST IMPORTANT OVERSIGHT MAY HAVE BEEN TO CONCENTRATE EXCLUSIVELY ON GERMAN PETROLEUM PRODUCTION. IN DOING SO, USSTAF OVERLOOKED THE VULNERABILITY OF PETROLEUM SUPPLIES AS THE GERMANS SHIPPED THEM VIA VULNERABLE PIPELINES, TRAINS, AND DANUBE RIVER BARGES.<sup>162</sup>

ON THE TACTICAL LEVEL, AMERICAN AIR PLANNERS WERE SLOW TO FIND EFFECTIVE COUNTERMEASURES TO THE TREMENDOUSLY ROBUST DEFENSES PROTECTING THE REFINERIES. THE TIDAL WAVE MISSION LOST 55 OF 178 BOMBERS FOR A LOSS RATE OF NEARLY 31%. MANY OF THE TACTICAL SHORTCOMINGS STEMMED FROM THE FACT THAT THE MISSION WAS CONCEIVED FAR FROM THE THEATER. THE AIR STAFF DECIDED THE PLAN TO A CONSIDERABLE DEGREE OF DETAIL. WHILE SOME ASPECTS OF THE PLAN WERE BRILLIANT, THE GERMANS WERE PROBABLY RIGHT IN CONCLUDING THAT A LOW-LEVEL SURPRISE ATTACK AGAINST PLOESTI WOULD NEVER WORK. IF NOTHING ELSE, THE WASHINGTON PLANNING SHOWED A LACK OF AWARENESS ABOUT THE TRAINING OF THE CREWS, SINCE MANY OF TIDAL WAVE’S PROBLEMS STEMMED FROM AIRCREW FAILING TO EXECUTE PROPERLY THE COMPLICATED PLAN. EVEN WORSE, LEADERS IN THE MEDITERRANEAN WERE UNWILLING TO CHANGE THE PLAN IN SPITE OF THE GROUP COMMANDERS’ OBJECTIONS. THIS BUREAUCRATIC INERTIA POSSIBLY COST THE LIVES OF MANY AIRCREW.

IN THE 1944 OPERATIONS, 5,675 BOMBER SORTIES DROPPED 13,599 TONS OF BOMBS WHILE LOSING 254 AIRCRAFT. THIS 4.5% LOSS RATE CERTAINLY IMPROVED OVER THE TIDAL WAVE MISSION.

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<sup>160</sup> Dr. Walt W. Rostow, “Recollections on Bombing,” in *Discovery: Research and Scholarship at the University of Texas at Austin*, n.p., on-line, internet, 12 May 2005, available at <http://www.utexas.edu/opa/pubs/discovery/disc1997v14n2/disc-recollect.html>.

<sup>161</sup> BECKER, 528; FIELD MARSHAL ERHARD MILCH, GERMAN AIR FORCE, WWII (RET.) AND LIEUTENANT GENERAL ADOLPH GALLAND, GERMAN AIR FORCE, WWII (RET.), “THE ALLIED COMBINED BOMBER OFFENSIVE: TWO GERMAN VIEWS,” IN *COMMAND AND COMMANDERS IN MODERN MILITARY HISTORY: PROCEEDINGS OF THE SECOND MILITARY HISTORY SYMPOSIUM, USAF ACADEMY, 2-3 MAY 1968*. EDITED BY LIEUTENANT COLONEL WILLIAM GEFFEN, USAF. (WASHINGTON, D.C.: OFFICE OF AIR FORCE HISTORY, 1971), 296-297.

<sup>162</sup> Dougherty, et al., 778.



HOWEVER, IT STILL GENERATED A FEARSOME DEATH TOLL OVER THE LENGTH OF THE OPERATION. IN FACT, THE DAYTIME LOSS RATE ACTUALLY INCREASED OVER TIME, FROM 3.7% IN APRIL TO 4.6% IN AUGUST.<sup>163</sup> THE MOST STRIKING CHARACTERISTIC OF THE 1944 RAIDS WAS THEIR PREDICTABILITY. THE AMERICANS ROUTINELY USED ONE OF TWO COMMON APPROACHES TO PLOESTI, AND FIFTEEN OF THE EIGHTEEN DAYLIGHT RAIDS OCCURRED BETWEEN 9:00 AND 12:00 IN THE MORNING.<sup>164</sup> DEFENDING FIGHTERS, THEREFORE, COULD EASILY PLAN THEIR TACTICS. THE AMERICANS DID INTRODUCE SEVERAL TACTICAL INNOVATIONS TO DEAL WITH THE FIGHTER THREAT, INCLUDING FIGHTER ESCORT, FIGHTER-BOMBER OPERATIONS, GEOGRAPHICALLY DISPERSED ATTACKS, AND OFFENSIVE FIGHTER SWEEPS. WHILE MOST OF THESE INNOVATIONS RESULTED IN SHORT-TERM GAINS, THE GERMANS AND ROMANIANS QUICKLY ADAPTED. AS SUCH, THE AIR-TO-AIR FIGHT BECAME A BATTLE OF ATTRITION, WITH INTERCEPTOR STRENGTH SLOWLY FALLING FROM 182 SORTIES ON 5 APRIL TO FORTY-SIX SORTIES ON 18 AUGUST.<sup>165</sup> THIS GRADUAL REDUCTION IN FIGHTER STRENGTH ALLOWED ANTI-AIRCRAFT DEFENSES TO TAKE UP THE SLACK. THE GERMAN GROUND-BASED DEFENSES INCREASED FROM 142 HEAVY GUNS ON 5 APRIL TO 278 GUNS AT THE CLOSE OF THE OPERATION. THE BOMBERS COUNTERED WITH CHAFF AND JAMMING, WHICH RENDERED THE GUN-LAYING WURZBURG RADARS INEFFECTIVE. HOWEVER, THE GERMANS QUICKLY ADAPTED, FINDING VISUAL SIGHTING AND RANGE-FINDING EFFECTIVE AGAINST THE DAYTIME BOMBERS.<sup>166</sup> INDEED, INTERVIEWS WITH GERMAN ANTI-AIRCRAFT GUNNERS AND TWO AAF STUDIES WERE CRITICAL OF FIFTEENTH AIR FORCE, STATING THAT THE BOMBERS SHOULD HAVE DIVERSIFIED THEIR FLIGHT PATHS, USED FEINTING ATTACKS, CONDUCTED MORE VIOLENT EVASIVE ACTION, AND SUPPRESSED THE ANTI-AIRCRAFT SITES WITH FRAGMENTATION BOMBS.<sup>167</sup>

THE STORY WAS MUCH THE SAME WITH REGARD TO PLOESTI'S PASSIVE DEFENSES. THE AMERICANS ATTEMPTED TO OVERCOME THE SMOKE DEFENSES WITH RADAR BOMBING, OFFSET VISUAL BOMBING, DIAMOND FORMATIONS, THE MASTER BOMBER WEATHER-SHIP, AND AN EXTENDED BOMBER STREAM. AS WITH THE ACTIVE DEFENSES, USSTAF INNOVATED SLOWLY ENOUGH SO THAT THE GERMAN DEFENSES COULD MATCH IMPROVEMENTS. THE INCREASING VOLUME OF GERMAN SMOKE FORCED THE BOMBERS TO DROP USING NON-VISUAL METHODS ON 129 OF 189 GROUP ATTACKS (66%). THIS CRIPPLED THE BOMBING EFFORT, SINCE NON-VISUAL METHODS PRODUCED A DISMAL 3.6% HIT RATE. IN CONTRAST, THE SMALL NUMBER OF VISUAL BOMBINGS PRODUCED RESPECTABLE HIT RATES OF 22.3% IN MAY, 31.7% IN JUNE, 33.1% IN JULY, AND 43.8% IN AUGUST. THE BOMBING RECORD APPEARS EVEN MORE DISAPPOINTING WHEN COMPARING THE NUMBERS OF HITS TO SORTIES FLOWN PER MISSION. ONLY IN AUGUST WERE THE AMERICANS ABLE TO GET MORE THAN ONE HIT PER BOMBER SORTIE, WITH THE 22

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<sup>163</sup> Army Air Forces Evaluation Board, Appendix D, 163-167.

<sup>164</sup> Army Air Forces Evaluation Board, 10.

<sup>165</sup> *Air Battle of Ploesti*, 81.

<sup>166</sup> Army Air Forces Evaluation Board, Appendix B, iii.

<sup>167</sup> ARMY AIR FORCE EVALUATION BOARD, APPENDIX B, IV; HEADQUARTERS, UNITED STATES STRATEGIC AIR FORCES IN EUROPE (OFFICE OF THE DIRECTOR OF OPERATIONS), *THE FEASIBILITY OF NEUTRALIZING HEAVY FLAK DEFENSES BY LOW FLYING AIRCRAFT ATTACKS*, 14 NOV 1944, OPERATIONAL PLANNING: ATTACKS AGAINST FLAK DEFENSES FILE, BOX 143, THE PAPERS OF CARL SPAATZ, LIBRARY OF CONGRESS, WASHINGTON, D.C., 3.

JULY MISSION REQUIRING A HIGH OF 10.2 SORTIES FOR EVERY HIT. FIFTEENTH AIR FORCE FINALLY FOUND THE FORMULA FOR SUCCESS AT THE END OF THE OPERATION. LONG BOMBER STREAMS RAN THE SMOKE POTS OUT OF CHEMICALS, WHILE FLEXIBLE TARGETING ALLOWED THE BOMBERS TO MAXIMIZE THEIR CHANCES OF SUCCESS. AS WITH THE ACTIVE DEFENSES, HOWEVER, THE CAPTURED GERMAN DEFENDERS WERE CRITICAL OF THE AMERICANS FOR TAKING SO LONG TO DEVELOP THESE TACTICS.<sup>168</sup>

## CONCLUSION

PLOESTI WAS A TRUE SAGA IN THE STORY OF AMERICAN AIRPOWER. IMPROVING OVER HIS PREDECESSOR, SPAATZ MADE PLOESTI A COMPONENT OF AN EFFECTIVE STRATEGY. TACTICALLY, HOWEVER, FIFTEENTH AIR FORCE COULD NOT UNBALANCE THE AXIS DEFENSE, AND THUS HAD TO SET ITS JAW FOR A GRUELING BATTLE OF ATTRITION. WHILE AIRMEN CAN REVEL IN THE FINAL STRATEGIC EFFECTS ACHIEVED, THEY SHOULD ALSO TAKE WARNING FROM THE PAINFUL COURSE IT TOOK TO GET THERE.

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<sup>168</sup> Army Air Force Evaluation Board, 12-13, Appendix B, iv.

## CHAPTER 3

### BALIKPAPAN – BIG DISTANCE, BIG TARGET

*...THESE MAKE THE FINEST AND MOST DECISIVE SET OF TARGETS FOR BOMBING ANYWHERE IN THE WORLD.*

*LIEUTENANT GENERAL GEORGE C. KENNEY, 29 OCTOBER 1943*

FROM THE BEGINNING OF THE WAR IN THE PACIFIC, ALLIED LEADERS WERE WELL AWARE OF JAPAN'S DEPENDENCE ON OVERSEAS OIL. BECAUSE OF THIS, STRIKING THE BALIKPAPAN REFINERIES HAD LONG BEEN A GOAL OF AMERICAN AIR FORCES IN THE SOUTHWEST PACIFIC. AS WITH PLOESTI, BALIKPAPAN SEEMED TO OFFER A LUCRATIVE INDUSTRIAL WEB TARGET, THE DESTRUCTION OF WHICH WOULD HAVE DELETERIOUS EFFECTS ON THE JAPANESE FIELDED FORCES AND WARTIME ECONOMY. HOWEVER, THE PLANNING FOR STRIKES TO BORNEO REVEALED SIGNIFICANT DISAGREEMENTS BETWEEN THE FIELD COMMANDERS AND THE AIR STAFF AS TO THE TRUE IMPORTANCE OF BALIKPAPAN. THESE DIFFERENCES WERE STILL UNRESOLVED WHEN THE TARGETS FINALLY CAME WITHIN RANGE OF ALLIED AIRPOWER EARLY IN THE FALL OF 1944. OF MORE IMMEDIATE CONCERN TO THE AIRCREWS WAS THE VALIDITY OF THE AMERICAN INTELLIGENCE ESTIMATES CONCERNING BALIKPAPAN'S DEFENSES. TRAGICALLY, THE FIRST TWO COSTLY MISSIONS TO THE "PLOESTI OF THE PACIFIC" WERE TO PROVE THESE ASSESSMENTS GROSSLY OPTIMISTIC.<sup>169</sup>

### STRATEGIC SITUATION, BALIKPAPAN AS A TARGET, AND JAPANESE DEFENSES

BY THE FALL OF 1944, ALLIED LAND, SEA, AND AIR FORCES CONVERGED ON JAPAN FROM SEVERAL AXES. AS JAPAN'S POSSESSIONS DWINDLED AND HER SUPPLY LINES CAME UNDER ATTACK, OIL RESOURCES BECAME EVER MORE CRITICAL. IN THIS SITUATION, IT SEEMED OBVIOUS THAT INCREASING PRESSURE ON THE JAPANESE PETROLEUM INDUSTRY WOULD HASTEN THE WAR'S END. WHAT WAS NOT SO OBVIOUS, HOWEVER, WAS THAT DESTRUCTION OF HER OVERSEAS OIL PRODUCTION WAS BUT ONE WAY, AND PERHAPS NOT THE BEST WAY, TO APPLY THIS ADDED PRESSURE. THIS SEEMED AS OBSCURE TO THE JAPANESE AS THE AMERICANS, HOWEVER, AS JAPAN STILL DEDICATED CONSIDERABLE RESOURCES TO DEFENDING HER HARD-WON OIL PRIZES.

DURING 1943 AND 1944, SOUTHWEST PACIFIC AREA (SWPA) FORCES MADE LARGE LEAPS IN THEIR DRIVE TOWARD THE PHILIPPINES, IN SPITE OF THE LIMITED RESOURCES AVAILABLE TO THE COMMAND. MACARTHUR'S FORCES FIRST CLEARED THE EASTERN HALF OF NEW GUINEA AND THEN, IN

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<sup>169</sup> THIS MONIKER COMES FROM: R. J. CONDON TO MINNEAPOLIS-HONEYWELL REGULATOR COMPANY, LETTER, SUBJECT: PLOESTI OF THE PACIFIC, 28 NOVEMBER 1944, FILE 730.309-5, AIR FORCE HISTORICAL RESEARCH AGENCY, MAXWELL AIR FORCE BASE, AL.

CONJUNCTION WITH SOUTH PACIFIC FORCES OPERATING IN THE SOLOMONS, ISOLATED THE STRONG JAPANESE POSITION AT RABAU. ALLIED FORCES COMPLETED THIS LATTER TASK WITH THE INVASION OF NEW BRITAIN IN DECEMBER 1943 AND THE CONQUEST OF THE ADMIRALTY ISLANDS IN APRIL 1944. THEREAFTER, MACARTHUR QUICKENED HIS WESTWARD PACE, MAKING LARGE JUMPS ALONG THE NORTHERN COAST OF NEW GUINEA TO HOLLANDIA, SARMI-WADKE-BIAK, AND FINALLY MOROTAI. THESE FINAL MOVES WERE OF PARTICULAR INTEREST TO AIRMEN, AS THE RESOURCE-RICH NETHERLANDS EAST INDIES CAME WITHIN BOMBER RANGE FOR THE FIRST TIME. ALLIED OPERATIONS WERE GOING SO WELL IN THE SOUTHWEST AND CENTRAL PACIFIC THAT THE JOINT CHIEFS OF STAFF ACCELERATED THE PHILIPPINE INVASION DATE FROM DECEMBER TO LATE OCTOBER 1944.<sup>170</sup>

THE JAPANESE STRUGGLED TO RESPOND TO THESE ALLIED MOVES. THE TWO-AXIS STRATEGY, ON THE ONE HAND, REPRESENTED AN ALLIED FAILURE TO SET STRATEGIC PRIORITIES. TO THE JAPANESE, ON THE OTHER HAND, THE DUAL OFFENSIVES PRODUCED A NEVER-ENDING STRATEGIC QUANDARY. THE JAPANESE COULD NEVER CONCENTRATE FORCES AGAINST EITHER THE SOUTHWEST PACIFIC OR CENTRAL PACIFIC OFFENSIVES WITHOUT FATALLY WEAKENING THE DEFENSE IN THE OTHER AREA. AS THESE ALLIED DRIVES CONVERGED ON THE PHILIPPINES, THE JAPANESE ARMY AND NAVY SALVAGED THE REMNANTS OF UNITS BATTERED IN THE SOLOMONS, NEW GUINEA, AND THE CENTRAL PACIFIC TO DEFEND THIS ISLAND CHAIN.<sup>171</sup> THE CONDITION OF JAPANESE AIR FORCES WAS PARTICULARLY SEVERE. BOTH THE ARMY AND NAVY POSSESSED A SIGNIFICANT NUMBER OF AIRCRAFT AND WERE EVEN INTRODUCING NEW MODELS, SUCH AS THE KAWANISHI N1K2-J (ALLIED CODE NAME "GEORGE") AND MITSUBISHI J2M (ALLIED CODE NAME "JACK") WITH MANY PERFORMANCE CHARACTERISTICS COMPARABLE TO THE AMERICAN F6F HELLCAT AND P-47 THUNDERBOLT.<sup>172</sup> HOWEVER, AMERICAN AIRPOWER HAD LARGELY DESTROYED THE EXPERIENCED CADRE OF ARMY AND NAVAL AVIATORS WITH WHICH THE JAPANESE STARTED THE WAR.<sup>173</sup> FOR ALL JAPANESE FORCES, LOGISTICS BECAME INCREASINGLY TENUOUS, DUE LARGELY TO THE DESTRUCTION OF JAPANESE SHIPPING. WITH WEAKENED DEFENSES, STRAINED LOGISTICS, AND A SHRINKING PERIMETER, ALLIED PLANNERS INEVITABLY LOOKED TO PETROLEUM AS A MEANS OF CRIPPLING WHAT REMAINED OF JAPANESE MILITARY POWER.

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<sup>170</sup> FOR A DETAILED DISCUSSION OF AIRPOWER'S CONTRIBUTIONS TO THESE OFFENSIVES, SEE THOMAS E. GRIFFITH, *MACARTHUR'S AIRMAN: GENERAL GEORGE C. KENNEY AND THE WAR IN THE SOUTHWEST PACIFIC* (LAWRENCE, KS: UNIVERSITY OF KANSAS PRESS, 1998), 144-182.

<sup>171</sup> EDWARD J. DREA, *MACARTHUR'S ULTRA: CODEBREAKING AND THE WAR AGAINST JAPAN, 1942-1945* (LAWRENCE, KS: UNIVERSITY OF KANSAS PRESS, 1992), 155.

<sup>172</sup> BASIL COLLIER, *JAPANESE AIRCRAFT OF WORLD WAR II WITH COLOUR PHOTOGRAPHS* (NEW YORK: MAYFLOWER BOOKS, 1979), 83-84, 106.

<sup>173</sup> FOR A DISCUSSION OF THE ATTRITION OF THE JAPANESE NAVAL AIR FORCE DURING THIS STAGE OF THE WAR, SEE MARK R. PEATTIE, *Sunburst: The Rise of Japanese Naval Air Power 1909-1941* (Annapolis, MD: Naval Institute Press, 2001), 176-189; FOR A DISCUSSION OF THE ATTRITION OF JAPANESE ARMY AIR FORCES IN NEW GUINEA, SEE GRIFFITH, 169-176.



FIGURE 3. EAST INDIES AND SURROUNDING AREAS

SOURCE: [HTTP://WWW.LIB.UTEXAS.EDU/MAPS/MIDDLE\\_EAST\\_AND\\_ASIA/INDONESIA\\_POL\\_2002.JPG](http://www.lib.utexas.edu/maps/middle_east_and_asia/indonesia_pol_2002.jpg)

THE PETROLEUM FACILITY AT BALIKPAPAN ON THE EAST COAST OF BORNEO MOST CAUGHT FEAF'S EYE (SEE FIGURE 3). BALIKPAPAN WAS THE LARGEST REFINING CENTER IN THE NETHERLANDS EAST INDIES AND THE SECOND LARGEST IN ALL OF SOUTHEAST ASIA.<sup>174</sup> THE STANDARD OIL COMPANY BUILT AND DUTCH TECHNICIANS RAN THE MODERN PANDASARI REFINERY PRIOR TO THE WAR.<sup>175</sup> THE DUTCH DESTROYED SOME EQUIPMENT AS THEY PULLED OUT OF BORNEO, BUT THE JAPANESE QUICKLY REPAIRED THE DAMAGE AND PUT THE REFINERIES TO USE. WHILE PANDASARI WAS THE MOST IMPORTANT TARGET, THERE WERE OTHER CRITICAL PETROLEUM OPERATIONS IN BALIKPAPAN. THESE INCLUDED CRACKING PLANTS, WHICH SERVED ALL THE REFINERIES IN THE BALIKPAPAN AREA, AND THE EDELEANU PLANT, WHICH PRODUCED SULFURIC ACID FOR THE SOLVENT TREATMENT OF GASOLINE. LESS VITAL OIL FACILITIES INCLUDED BOILER HOUSES SCATTERED THROUGHOUT THE COMPLEX, TANK FARMS, AND AN OLD REFINERY THAT HAD BEEN IDLED AFTER THE CONSTRUCTION OF PANDASARI. FINALLY, BALIKPAPAN

<sup>174</sup> AIR EVALUATION BOARD, 7.

<sup>175</sup> Condon, 1

SUPPORTED A LUBRICATING OIL PLANT, PARAFFIN PLANT, OIL DRUM FACTORY, PIERS, JETTIES, AND WORKER'S BARRACKS AREAS.<sup>176</sup>

WHILE ALLIED PLANNERS HAD AN EXCELLENT UNDERSTANDING OF THE OIL FACILITIES IN BALIKPAPAN, THEIR KNOWLEDGE OF THE JAPANESE OUTPUT WAS FAR LESS REFINED. THE NETHERLANDS MILITARY OIL SERVICE (NMOIS) WAS AT THE FOREFRONT OF THIS ANALYSIS, ESTIMATING THAT BALIKPAPAN WAS SHIPPING 2.3 MILLION BARRELS OF OIL ANNUALLY.<sup>177</sup> SWPA ANALYSTS, HOWEVER, EMPHASIZED THE MAXIMUM CAPACITY OF THE REFINERIES, WHICH THEY ESTIMATED AT SEVEN MILLION BARRELS.<sup>178</sup> SWPA CLAIMED THAT THE "ENEMY HAD 'CANNIBALIZED' PETROLEUM PROCESSING PLANTS ON THE JAPANESE MAINLAND TO BUILD UP BALIKPAPAN SO AS TO OBTAIN THE MAXIMUM OUTPUT FROM THESE REFINERIES LOCATED NEAR THE SOURCE OF CRUDE OIL SUPPLY. AN EFFECTIVE BLOW TO THESE INSTALLATIONS WOULD CRIPPLE ENEMY PRODUCTION OF HIGH-OCTANE AVIATION GASOLINE AND HIGH-GRADE LUBRICATING OIL."<sup>179</sup> THE AMERICANS BASED THIS ON THEIR CALCULATION THAT THE REFINERIES PRODUCED AS MUCH AS 40% OF THE HIGH-OCTANE AVIATION GASOLINE AVAILABLE IN THEATER.<sup>180</sup> BALIKPAPAN'S OIL PRODUCTION, IN FACT, WAS SOMEWHAT BETWEEN THESE TWO ESTIMATES, WITH THE JAPANESE REFINING 3.9 MILLION BARRELS OF FUEL IN 1943. HOWEVER, THIS WAS ONLY 15.4% OF THE REFINED PETROLEUM EXPORTED FROM THE OCCUPIED AREAS. THE VAST MAJORITY OF JAPAN'S IMPORTED PETROLEUM CAME, INSTEAD, FROM SUMATRA (58.3%), WITH MILLI, ON THE WEST COAST OF BORNEO, PRODUCING ROUGHLY THE SAME AMOUNT AS BALIKPAPAN.<sup>181</sup>

MORE IMPORTANT THAN THEIR UNDERSTANDING OF OUTPUT, THE AMERICANS DID NOT PERCEIVE HOW THE BIFURCATED NATURE OF THE JAPANESE LOGISTICS SYSTEM HAMPERED THE EFFICIENCY OF HER PETROLEUM SUPPLY. UNLIKE THE UNITED STATES AND GERMANY, JAPAN'S ARMY AND NAVY RAN HER OIL RESOURCES DIRECTLY. THE JAPANESE DIVIDED THE CAPTURED REFINERIES IN THE OCCUPIED AREAS BASED ON WHICH SERVICE CONTRIBUTED MORE TO THEIR CONQUEST. SINCE THE ARMY PROVIDED MOST OF THE FORCES FOR THE OCCUPATION OF THE SOUTHERN REGION, THEY ASSUMED CONTROL OF ALL FACILITIES WEST OF BORNEO'S CENTRAL MOUNTAINS, COMPRISING 85% OF THE AREA'S PRODUCTION CAPACITY. THE ONLY REFINERY EAST OF THIS LINE, AND THUS UNDER NAVY CONTROL, WAS BALIKPAPAN. THIS ARRANGEMENT WAS PROBLEMATIC, SINCE THE NAVY WAS BY FAR THE LARGEST CONSUMER OF

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<sup>176</sup> Air Evaluation Board, 7, 11.

<sup>177</sup> Air Evaluation Board, 9.

<sup>178</sup> The United States Strategic Bombing Survey, Military Analysis Division, *The Thirteenth Air Force in the War Against Japan*, 12.

<sup>179</sup> Air Evaluation Board, 7.

<sup>180</sup> Condon, 1.

<sup>181</sup> REAR ADMIRAL K. NAKAMURA, IMPERIAL JAPANESE NAVY, TO HEADQUARTERS U.S. STRATEGIC BOMBING SURVEY, OIL, CHEMICAL, AND RUBBER DIVISION (PACIFIC), TABLE, "FUEL TRANSPORTED FROM OCCUPIED AREAS," 14 NOVEMBER 1945, FILE 51.B.(12)(H), CRUDE OIL IMPORTS, PRODUCTION, AND EXPORTS, PACIFIC SURVEY, GENERAL RECORDS; RECORDS OF THE US STRATEGIC BOMBING SURVEY, RG 243, NATIONAL ARCHIVES AT COLLEGE PARK, COLLEGE PARK, MD; CAPTAIN MICHIO HARA, IMPERIAL JAPANESE NAVY., INTERVIEWED BY LIEUTENANT COMMANDER G. M. WILLIAMS, 15 OCTOBER 1945, FILE 51.B.(22)(B), NAVAL OIL SUPPLY – BORNEO, PACIFIC SURVEY, GENERAL RECORDS, RECORDS OF THE US STRATEGIC BOMBING SURVEY, RG 243; THE NATIONAL ARCHIVES AT COLLEGE PARK, COLLEGE PARK, MD.

PETROLEUM. TECHNICALLY, OIL WAS A SHARED RESOURCE, AND FUEL BUREAU IN THE JAPANESE MUNITIONS MINISTRY HAD THE AUTHORITY TO DIRECT LOADED TANKERS TO ANY DESTINATION. HOWEVER, THE FUEL BUREAU DID NOT HAVE ENOUGH INFORMATION TO EXECUTE THIS RESPONSIBILITY PROPERLY; SO, THE SERVICES TENDED TO LOOK AFTER THEIR OWN INTERESTS FIRST. AS SUCH, THE 102<sup>ND</sup> FUEL DEPOT AT BALIKPAPAN STROVE TO SUPPORT JAPANESE FLEET NEEDS.<sup>182</sup> BALIKPAPAN DISPERSED 63% OF ITS PRODUCTION TO NAVY UNITS LOCALLY AND SENT THE REMAINING PORTION TO JAPAN MAINLY FOR USE BY HOME FLEET.<sup>183</sup>

SINCE BALIKPAPAN WAS ATTEMPTING TO SATISFY AS MANY NAVAL REQUIREMENTS AS POSSIBLE, THE REFINERY HAD LESS IMPACT ON JAPANESE ARMY AND EVEN NAVY AVIATION THAN AMERICAN PLANNERS REALIZED. IN SPITE OF ITS UNIQUE CAPACITY TO PRODUCE HIGH-OCTANE AVIATION FUEL, BALIKPAPAN CONCENTRATED ON FUEL OIL FOR SHIPS, DEDICATING ONLY ABOUT 20% OF OUTPUT TO AVIATION FUEL.<sup>184</sup> THE HIGH-OCTANE FUEL SHIPPED FROM BALIKPAPAN MAINLY SUPPORTED THE NAVY'S SURABAYA FUEL DEPOT, SERVICING JAVA, KENDARI, AND AMBON, WITH SMALLER SHIPMENTS TO PALAU, SAIPAN, AND JAPAN.<sup>185</sup> "A FEW TANKERS" DELIVERED AVIATION GASOLINE TO THE PREDOMINATELY ARMY AREAS OF SINGAPORE AND MANILA, BUT THIS WAS PROBABLY TO SUPPORT THE SMALL NAVAL AVIATION UNITS AT THESE LOCATIONS.<sup>186</sup> IT WOULD HAVE BEEN ILLOGICAL FOR THE NAVY'S SOLE REFINERY TO SEND HIGH-OCTANE FUEL TO ARMY DEPOTS, SINCE THE REFINERY'S AVERAGE MONTHLY OUTPUT MET ONLY 84% OF THE NAVY'S AVIATION NEEDS. TO MEET THE SHORTFALL, THE SEA SERVICE TO IMPORTED HIGH-OCTANE FUEL FROM ARMY REFINERIES FURTHER TO THE EAST.<sup>187</sup>

BECAUSE OF BALIKPAPAN'S FOCUS ON NAVAL REQUIREMENTS, THE IMPERIAL JAPANESE NAVY DEDICATED CONSIDERABLE FORCES TO ITS PROTECTION. THE LOCAL DEFENSE OF BALIKPAPAN WAS THE

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<sup>182</sup> REAR ADMIRAL RYUICHIRO ENOMOTO, IMPERIAL JAPANESE NAVY., INTERVIEWED BY THE US STRATEGIC BOMBING SURVEY, 29 OCTOBER 1945, FILE 51.B.(22)(D), NAVAL OIL SUPPLY – BORNEO, PACIFIC SURVEY, GENERAL RECORDS, RECORDS OF THE US STRATEGIC BOMBING SURVEY, RG 243; THE NATIONAL ARCHIVES AT COLLEGE PARK, COLLEGE PARK, MD, 2.

<sup>183</sup> Enomoto, 4.

<sup>184</sup> UNITED STATES STRATEGIC BOMBING SURVEY, OIL AND CHEMICAL DIVISION, *OIL IN JAPAN'S WAR* (WASHINGTON, D.C.: US GOVERNMENT PRINTING OFFICE, 1946), 77; LIEUTENANT COMMANDER G.M. WILLIAMS, MEMORANDUM TO OIL AND CHEMICAL DIVISION, USSBS, 5 JANUARY 1946, FILE 51.B.(37)(A-D), PETROLEUM DATA – BORNEO, PACIFIC SURVEY, GENERAL RECORDS, RECORDS OF THE US STRATEGIC BOMBING SURVEY, RG 243, NATIONAL ARCHIVES AT COLLEGE PARK, COLLEGE PARK, MD, ENCLOSURE C, 1; VICE ADMIRAL K. MORITA, IMPERIAL JAPANESE NAVY., INTERVIEW BY US STRATEGIC BOMBING SURVEY, FILE 51.B.(22)(K), OIL, PACIFIC SURVEY, GENERAL RECORDS, RECORDS OF THE US STRATEGIC BOMBING SURVEY, RG 243, NATIONAL ARCHIVES AT COLLEGE PARK, COLLEGE PARK, MD, 6.

<sup>185</sup> Williams, Enclosure C, 1.

<sup>186</sup> Major M. de Blank, Netherlands East Indies Oil Rehabilitation Team, *Report of Japanese Activities in Balikpapan*, 19 August 1945, file 55.B.(37).(a), Petroleum Data – Borneo, Pacific Survey, General Records, Records of the US Strategic Bombing Survey, RG 243; The National Archives at College Park, College Park, Md, 8.

<sup>187</sup> REAR ADMIRAL MIZUHIKO WATANABE, IMPERIAL JAPANESE NAVY, MEMORANDUM TO US STRATEGIC BOMBING SURVEY, SUBJECT: REPORT ON MONTHLY PRODUCTION CAPACITY AND PRODUCTS OF VARIOUS REFINERIES, 29 NOVEMBER 1945, FILE 51.B.(37)(A-D), PETROLEUM DATA – BORNEO, PACIFIC SURVEY, GENERAL RECORDS; RECORDS OF THE US STRATEGIC BOMBING SURVEY, RG 243; NATIONAL ARCHIVES AT COLLEGE PARK, COLLEGE PARK, MD, 1.

RESPONSIBILITY OF THE 22<sup>ND</sup> BASE FORCE OF THE 2<sup>ND</sup> SOUTHERN EXPEDITIONARY FLEET, SOUTH WEST AREA FLEET. IN TOTAL, THIS ORGANIZATION WAS RESPONSIBLE FOR THE ADMINISTRATION OF THE BASE, MILITARY CONSTRUCTION PROJECTS, AND DEFENSE. THE AREA DEFENSE FORCE UNDER ITS COMMAND CONSISTED OF A SIGNAL DETACHMENT, GUARD TROOPS, AND SMALL NAVAL UNIT FOR COASTAL PATROL.<sup>188</sup> ADDITIONALLY, THE BASE FORCE COMMANDED ANTI-AIRCRAFT DEFENSES, WHICH CONSISTED OF THIRTY-ONE HEAVY (SIX 127MM, THIRTEEN 120MM, THREE 100MM, NINE 75MM) AND APPROXIMATELY TWICE AS MANY MEDIUM ANTI-AIRCRAFT GUNS. EARLY-WARNING RADAR AND FOUR SOUND LOCATORS DIRECTED THE AIR AND GROUND-BASED AIR DEFENSES.<sup>189</sup> AMERICAN INTELLIGENCE CLASSIFIED BALIKPAPAN'S GROUND-BASED AIR DEFENSES AS "...THE BEST BALANCED AA PROTECTION TO BE FOUND IN THE SOUTHWEST PACIFIC THEATER."<sup>190</sup> A SMALL DETACHMENT OF FLOAT PLANES ROUNDED OUT THE 22<sup>ND</sup> BASE FORCE, BUT THESE ONLY SUPPORTED COASTAL PATROL DUTIES.<sup>191</sup>

DURING THE WINTER OF 1944, JAPANESE ARMY AND NAVY AIR FORCE COMMANDERS REALIGNED THEIR UNITS TO PROVIDE BETTER PROTECTION FOR THE OIL REFINERIES.<sup>192</sup> JAPANESE AIR DEFENSE OF THE NETHERLANDS EAST INDIES WAS THE RESPONSIBILITY OF THE NAVY'S 23<sup>RD</sup> AIR FLOTILLA UNDER THE 13<sup>TH</sup> AIR FLEET. THE 23<sup>RD</sup> AIR FLOTILLA, HEADQUARTERED AT KENDARI IN THE CELEBES, CONTROLLED THREE AIR GROUPS: THE 153<sup>RD</sup> *KOKUTAI* FOR RECONNAISSANCE, THE 753<sup>RD</sup> *KOKUTAI* WITH MEDIUM BOMBERS, AND THE NEW 381<sup>ST</sup> *KOKUTAI* WITH FIGHTERS. THE 381<sup>ST</sup> FORMED IN JAPAN IN THE FALL OF 1943. THE GROUP WAS CONVERTING TO J2M *RAIDEN* INTERCEPTORS WHEN 23<sup>RD</sup> AIR FLOTILLA ORDERED IT TO MANGGAR AIRFIELD, NEAR BALIKPAPAN, IN FEBRUARY 1944. THE *RAIDEN*'S TEETHING PROBLEMS FORCED THE GROUP TO DEPLOY WITH ITS OLDER A6M5 *REISEN* FIGHTERS. BY APRIL, THE GROUP DIRECTED TWO *HIKOTAI* (SQUADRONS) OF A6Ms, EACH CONSISTING, AT FULL STRENGTH, OF THIRTY-SIX FRONT-LINE FIGHTERS WITH TWELVE AIRCRAFT IN ATTRITION RESERVE. ONE OF THESE SQUADRONS, S602, SLOWLY CONVERTED TO *RAIDENS* DURING THE ENSUING MONTHS; BUT, IT STILL OPERATED LESS THAN TEN OF THE AIRCRAFT DURING THE BALIKPAPAN AIR BATTLES. SOME OF THE ZERO FIGHTERS WERE EQUIPPED WITH A NEW WEAPON, WHICH THE JAPANESE CALLED THE "NO. 3 BOMB." THIS WAS AN AIR-TO-AIR INCENDIARY DEVICE DESIGNED TO DESTROY BOMBERS. IN ADDITION TO THE DAY FIGHTERS, THE 381<sup>ST</sup> *KOKUTAI* COMMANDED ONE *HIKOTAI* OF EIGHTEEN J1N1-S *GEKKO* TWIN-ENGINE NIGHT FIGHTERS, WITH SIX AIRCRAFT IN ATTRITION RESERVE.<sup>193</sup>

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<sup>188</sup> *JAPANESE AIR FORCES IN WORLD WAR II: THE ORGANIZATION OF THE JAPANESE ARMY AND NAVAL AIR FORCES, 1945* (LONDON: ARMS AND ARMOUR PRESS, 1979), 108-109.

<sup>189</sup> HEADQUARTERS ALLIED AIR FORCES, *FLAKINTEL BULLETIN NO. 58: JAPANESE ANTI-AIRCRAFT ARTILLERY AT BALIKPAPAN*, FILE 706.3812, AIR FORCE HISTORICAL RESEARCH AGENCY, MAXWELL AIR FORCE BASE, AL), N.P.; V BOMBER COMMAND. *HEAVY BOMBER STRIKES OF SEPT. 30, OCT. 10, AND OCT. 14, 1944 ON PADANSARI REFINERY, EDELEANU (BENDEX) PLANT, AND PARAFFIN & LUBRICATING OIL REFINERY AT BALIKPAPAN, BORNEO*, FILE 732.333, HISTORICAL RESEARCH AGENCY, MAXWELL AIR FORCE BASE, AL, N.P.

<sup>190</sup> Air Advisory Board, 43.

<sup>191</sup> *Japanese Air Forces in World War II*, 108

<sup>192</sup> The United States Strategic Bombing Survey, Military Analysis Division, 12

<sup>193</sup> The Allied code names for the Japanese fighters were as follows: J2M Raiden [Thunderbolt] – Jack; A6M Reisen [Zero] – Zeke; J1N1-S Gekko [Moonbeam] – Irving. The A6M5s of Ku 381 could also have



THE US STRATEGIC BOMBING SURVEY CHARACTERIZED KU 381 AS ONE OF THE BEST FIGHTER GROUPS IN THE JAPANESE NAVY.<sup>194</sup> BY WAY OF EXPLANATION, THE COMMANDER OF THE UNIT BELIEVED “WE WERE VERY LUCKY BECAUSE WE HAD PLENTY OF OIL IN BALIKPAPAN. I COULD TRAIN MY AVIATORS VERY HARD.” AS THE SITUATION REQUIRED, THE 13<sup>TH</sup> AIR FLEET REINFORCED KU 381 WITH A6MS OF THE 28<sup>TH</sup> AIR FLOTILLA’S 331<sup>ST</sup> *KOKUTAI* BASED AT SINGAPORE.<sup>195</sup> THE JAPANESE AIR FORCES, THEREFORE, WERE POSITIONED, TRAINED, AND EQUIPPED TO TAKE ON MACARTHUR’S AIRMEN, WHO WERE THEN FINALIZING PLANS FOR THE DESTRUCTION OF THE BALIKPAPAN REFINERIES.

#### FAR EAST AIR FORCES – FORCE STRUCTURE, LEADERSHIP, AND EARLY OPERATIONS

FAR EAST AIR FORCES (FEAF) WAS MACARTHUR’S AIR ARM IN THE SOUTHWEST PACIFIC. BY 1944, THE ORGANIZATION AND THE LEADERSHIP WERE EXPERIENCED AND COMBAT TESTED. HOWEVER, THE UNITS WERE STILL ADJUSTING TO A MAJOR REORGANIZATION OF AMERICAN AIR EFFORT IN THE THEATER. THIS REORGANIZATION CREATED A NEW OVERARCHING COMMAND, SHUFFLED LEADERSHIP POSITIONS, AND DELINEATED NEW RESPONSIBILITIES TO SUBORDINATE UNITS. BALIKPAPAN, THEREFORE, PROVED A MAJOR TEST FOR FEAF, ESPECIALLY SINCE THIS WAS THE FIRST SIGNIFICANT STRATEGIC BOMBING OPERATION FOR ANY SWPA AIR UNIT.

THE CONCLUSION OF THE SOLOMONS CAMPAIGN ALLOWED THE CONSOLIDATION OF ALLIED AIR POWER IN THE SOUTH PACIFIC. PREVIOUSLY, FIFTH AIR FORCE, COMMANDED BY GENERAL GEORGE KENNEY, SUPPORTED MACARTHUR IN NEW GUINEA WHILE THIRTEENTH AIR FORCE, COMMANDED BY GENERAL ST. CLAIR STREET, PROVIDED AIR SUPPORT TO AMPHIBIOUS OPERATIONS IN THE SOLOMONS. ON 14 JUNE 1944, MACARTHUR CREATED A NEW ORGANIZATION, FAR EAST AIR FORCES, TO OVERSEE THESE SUBORDINATE COMMANDS.<sup>196</sup> THIS NEW HEADQUARTERS DREW ITS NEW COMMANDER AND MOST OF ITS STAFF FROM FIFTH AIR FORCE.<sup>197</sup>

KENNEY’S MOVE TO THEATER AIR COMMANDER WAS THE CULMINATION OF A LONG AND SUCCESSFUL ARMY AIR FORCE CAREER. KENNY STARTED FLYING IN 1917, WHEN THE FORMER MIT STUDENT AND CONSTRUCTION CONTRACTOR ENLISTED IN THE WWI ARMY AIR SERVICE. THE YOUNG AVIATOR FLEW SEVENTY-FIVE OBSERVATION MISSIONS IN FRANCE, EARNING THE DISTINGUISHED

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been characterized as “Hamps.” This code name was developed to describe the clipped-wing A6M3 but was eventually dropped. The A6M5 was not a direct derivative of the A6M3, but it was another short-wing Zero version. For a detailed discussion of Allied code names, see Rene J. Francillon, *Japanese Aircraft of the Pacific War* (Annapolis, MD: Naval Institute Press, 1979).

<sup>194</sup> The United States Strategic Bombing Survey, Military Analysis Division, 12

<sup>195</sup> KATSUHIRO UCHIDA, “THE ZERO MAYOR’ KUROSAWA, TAKEO,” IN NAVY ACES AND PILOTS. 18 AUGUST 2001, N.P., ON LINE, INTERNET, 27 MARCH 2005, AVAILABLE FROM [HTTP://WWW.J-AIRCRAFT.COM/FAQ/NAVY\\_ACES.HTM](http://www.j-aircraft.com/FAQ/NAVY_ACES.HTM); *JAPANESE AIR FORCES IN WORLD WAR II*, 88-92, 136-137.

<sup>196</sup> WESLEY FRANK CRAVEN AND JAMES LEA CRATE, EDS., *THE ARMY AIR FORCES IN WORLD WAR II. VOL. 4: THE PACIFIC: GUADALCANAL TO SAIPAN AUGUST 1942 TO JULY 1944* (WASHINGTON, D.C.: OFFICE OF AIR FORCE HISTORY, 1983), 648.

<sup>197</sup> “Fifth Air Force in Australia, 1942-1945,” available on-line at <http://home.st.net.au/~dunn/5thaf.htm>, Internet, 25 March 2005.

SERVICE CROSS, SILVER STAR, AND CREDIT FOR TWO AERIAL VICTORIES.<sup>198</sup> DURING THE INTERWAR YEARS, KENNEY BENEFITED FROM THE ARMY'S PROFESSIONAL EDUCATION SYSTEM, ATTENDING THE AIR SERVICE ENGINEERING SCHOOL, THE AIR SERVICE TACTICAL SCHOOL, COMMAND AND GENERAL STAFF COLLEGE, AND EVENTUALLY THE ARMY WAR COLLEGE. ONE OF KENNEY'S LONGEST ASSIGNMENTS WAS AS AN INSTRUCTOR AT THE AIR CORPS TACTICAL SCHOOL, WHICH WAS THEN LEADING DOCTRINAL DEBATE OVER THE THEORY OF STRATEGIC BOMBING. KENNEY WAS NOT CENTRAL TO THESE ARGUMENTS, HOWEVER, AS HE SPECIALIZED IN ATTACK AVIATION. AS WORLD WAR II APPROACHED, KENNEY SERVED IN A VARIETY OF IMPORTANT STAFF ASSIGNMENTS. BY 1942, HE COMMANDED FOURTH AIR FORCE, RESPONSIBLE FOR DEFENSE OF AND TRAINING IN THE WESTERN US.<sup>199</sup> GENERAL ARNOLD, IMPRESSED WITH KENNEY'S BACKGROUND AND COMMAND ABILITY, SOON DISPATCHED HIM TO THE SOUTHWEST PACIFIC AREA (SWPA) TO REPLACE GENERAL GEORGE BRETT AS THE COMMANDER OF THE ALLIED AIR FORCES. IN SHORT ORDER, KENNEY WAS ABLE TO DO WHAT BRETT COULD NOT - GAIN THE CONFIDENCE OF GENERAL DOUGLAS MACARTHUR.<sup>200</sup> IN THE NEXT TWO YEARS, KENNEY'S ACTIVITIES BECAME CENTRAL TO MACARTHUR'S LEAPFROG OPERATIONS ALONG THE NEW GUINEA COAST.<sup>201</sup>

THE MISSION AND SOMETIMES BASING OF FEAF'S TWO SUBORDINATE COMMANDS HAD MERGED DURING THE OFFENSIVES ACROSS WESTERN NEW GUINEA.<sup>202</sup> BOTH THE FIFTH AND THIRTEENTH AIR FORCE FLEW SIMILAR TYPES OF AIRCRAFT (INCLUDING B-24 BOMBERS AND P-38 AND P-47 FIGHTERS), ALTHOUGH FIFTH AIR FORCE WAS CONSIDERABLY LARGER. IN THE SUMMER OF 1944, FIFTH AIR FORCE CONSISTED OF FOUR B-24 GROUPS (THE 22<sup>ND</sup> RED RAIDERS, THE 43<sup>RD</sup> KEN'S MEN, THE 90<sup>TH</sup> JOLLY ROGERS, AND THE 380<sup>TH</sup> FLYING CIRCUS), THREE LIGHT BOMBER GROUPS (3<sup>RD</sup>, 38<sup>TH</sup>, AND 345<sup>TH</sup>), AND SIX FIGHTER GROUPS (8<sup>TH</sup>, 49<sup>TH</sup>, 475<sup>TH</sup>, 35<sup>TH</sup>, 58<sup>TH</sup>, AND 348<sup>TH</sup>).<sup>203</sup> ON PAPER, FIFTH AIR FORCE CONTROLLED THREE ADDITIONAL BOMB WINGS; BUT, THESE WERE ACTUALLY TASK FORCE HEADQUARTERS TO WHICH UNITS WERE ASSIGNED FOR SPECIFIC AMPHIBIOUS OPERATIONS.<sup>204</sup> FIFTH AIR FORCE WAS IN THE ABLE HANDS OF ENNIS WHITEHEAD, WHO, LIKE KENNEY, WAS A WORLD WAR I AVIATOR AND TRAINED ENGINEER. WHITEHEAD GRADUATED FROM COMMAND AND GENERAL STAFF COLLEGE JUST PRIOR TO THE WAR, AND THEN SERVED ON THE WAR DEPARTMENT GENERAL STAFF. KENNEY AND WHITEHEAD HAD A CLOSE RELATIONSHIP, RESULTING FROM WHITEHEAD'S SEVERAL YEARS AS THE DEPUTY COMMANDER FOR FIFTH AIR FORCE.<sup>205</sup>

THIRTEENTH AIR FORCE OFTEN SERVED IN A SUPPORTING ROLE TO FIFTH AIR FORCE DUE TO ITS SIGNIFICANTLY SMALLER SIZE. IN THE SUMMER OF 1944, THIRTEENTH AIR FORCE CONSISTED OF TWO B-24 GROUPS (5<sup>TH</sup> BOMBER BARONS AND 307<sup>TH</sup> LONG RANGERS), ONE MEDIUM BOMBER GROUP

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<sup>198</sup> Griffith, 5-16.

<sup>199</sup> Griffith, 17-45.

<sup>200</sup> Griffith, 47-70.

<sup>201</sup> Griffith, 97.

<sup>202</sup> Craven and Cate, vol. 4, 648.

<sup>203</sup> "Army Air Force Unit Database," n.p.

<sup>204</sup> Griffith, 175.

<sup>205</sup> Ancell with Miller, 457.

(42<sup>ND</sup>), AND TWO P-38 GROUPS (18<sup>TH</sup> AND 347<sup>TH</sup>).<sup>206</sup> ST. CLAIR STRETT WAS THE NEW COMMANDER OF THIRTEENTH AIR FORCE, WHICH NATHAN TWINING HAD ALSO COMMANDED EARLIER IN THE WAR. LIKE KENNEY AND WHITEHEAD, STRETT WAS A WWI AVIATOR, COMMAND AND GENERAL STAFF COLLEGE GRADUATE, AND EXPERIENCED STAFF OFFICER. PRIOR TO THE MOVE TO THE PACIFIC, STREET COMMANDED THIRD AND THEN SECOND AIR FORCE.<sup>207</sup> SURPRISINGLY, STRETT RECOMMENDED DISSOLVING HIS SMALL AND SEEMINGLY REDUNDANT COMMAND. HOWEVER, KENNEY MAINTAINED BOTH NUMBERED AIR FORCE HEADQUARTERS AS A MEANS FOR ORGANIZATIONAL FLEXIBILITY. AS HE HAD DONE WITH HIS AIR TASK FORCES IN FIFTH AIR FORCE, KENNEY ASSIGNED FIFTH AND THIRTEENTH AIR FORCES DISTINCT MISSIONS AND THEN TRANSFERRED UNITS BETWEEN THE HEADQUARTERS AS THOSE MISSIONS REQUIRED. THIS ALLOWED ONE HEADQUARTERS TO CONDUCT THE CURRENT OPERATION WHILE THE OTHER HEADQUARTERS PLANNED FOR THE SUBSEQUENT ONE. ADDITIONALLY, THE TWO HEADQUARTERS PROVIDED THE CAPABILITY TO SPLIT FEAF TO SUPPORT SIXTH AND EIGHTH ARMIES DURING THE UPCOMING INVASION OF THE PHILIPPINES. FORTUNATELY, RELATIONS BETWEEN THE NUMBERED AIR FORCE COMMANDERS WERE CORDIAL AND THE STAFFS “KEPT UP A STEADY EXCHANGE OF MEMORANDA DURING 1944, SETTLING MANY MATTERS ON AN INFORMAL BASIS.”<sup>208</sup>

ALTHOUGH THEY SUPPORTED DIFFERENT CAMPAIGNS DURING 1943 AND EARLY 1944, FIFTH AND THIRTEENTH AIR FORCE BROUGHT SIMILAR PERSPECTIVES TO THE BALIKPAPAN OPERATION. BOTH ORGANIZATIONS HAD GAINED CONSIDERABLE COMBAT EXPERIENCE, ALTHOUGH NOT IN THE AREA OF STRATEGIC BOMBING. INSTEAD, THE AIR FORCES POSSESSED A STRONG TACTICAL FOCUS, DERIVED FROM TWO YEARS OF SUPPORTING JOINT OFFENSIVE OPERATIONS IN THEIR RESPECTIVE THEATERS. FIFTH AIR FORCE WAS KNOWN AS “MACARTHUR’S AIR FORCE,” AS IT HAD BEEN AN INDISPENSABLE PART OF SWPA’S WESTWARD DRIVE TO RE-CONQUER NEW GUINEA SINCE SEPTEMBER 1942. IN THESE OPERATIONS, FIFTH AIR FORCE PERFECTED THE TECHNIQUES OF ESTABLISHING AIR SUPERIORITY, MAULING JAPANESE LOGISTICS, AND THEN SUPPORTING AMPHIBIOUS OR AIRBORNE LANDINGS. EACH SUCCESSFUL OPERATION PROVIDED NEW AIRFIELDS FROM WHICH FIFTH AIR FORCE COULD REPEAT THE PROCEDURE.<sup>209</sup> IN THE NEW GUINEA CAMPAIGN, FIFTH AIR FORCE NEVER DEVELOPED A CLOSE RELATIONSHIP WITH THE NAVY OR MARINES, ALTHOUGH THE STAFF WAS COMFORTABLE WORKING WITH AUSTRALIAN UNITS.<sup>210</sup> THIRTEENTH AIR FORCE, IN CONTRAST, BECAME KNOWN AS THE “JUNGLE AIR FORCE” AS IT INTEGRATED TIGHTLY WITH THE NAVY AND MARINES IN THE PUSH UP THE DENSELY-VEGETATED SOLOMON ISLANDS FROM GUADALCANAL. IN THIS CAMPAIGN, THIRTEENTH AIR FORCE COMPENSATED FOR ITS SMALL SIZE BY ACCOMPLISHING THE AIR TASKS MOST APPROPRIATE FOR ITS LIMITED EQUIPMENT, WHILE RELYING ON NAVY AND MARINE AIR ELEMENTS TO ACCOMPLISH THE TASKS

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<sup>206</sup> “Army Air Force Unit Database,” n.p.

<sup>207</sup> Ancell with Miller, 446-447.

<sup>208</sup> Craven and Cate, vol. 4, 650-651.

<sup>209</sup> Griffith, 97.

<sup>210</sup> Griffith, 60-63.

SITUATED TO THEIR AIRCRAFT AND TRAINING.<sup>211</sup> MUCH OF FIFTH AND THIRTEENTH AIR FORCE'S EXPERIENCE TRANSLATED TO THE BALIKPAPAN OPERATION. HOWEVER, THIS INDEPENDENT AIR OPERATION AGAINST AN INDUSTRIAL TARGET REQUIRED SOME DIFFERENT FLYING SKILLS, SUCH AS LARGE ATTACK FORMATIONS, PRECISION NAVIGATION AND TIMING, AND DETAILED BOMBING ASSIGNMENTS AGAINST AN EXPANSIVE TARGET AREA. MORE IMPORTANTLY, BALIKPAPAN REQUIRED THE AIR INTELLIGENCE UNITS TO ANALYZE AN INDUSTRIAL SYSTEM RATHER THAN A FIELDED MILITARY FORCE.

FORTUNATELY FOR FEAFF, BALIKPAPAN WAS NOT ENTIRELY VIRGIN GROUND. ON 13 AUGUST 1943, LESS THAN TWO WEEKS AFTER THE LOW-LEVEL TIDAL WAVE ATTACK AGAINST PLOESTI, ELEVEN B-24S FROM 380<sup>TH</sup> BOMBARDMENT GROUP TOOK OFF FROM DARWIN IN POOR WEATHER. LOADED WITH 500 LB. BOMBS, NINE AIRCRAFT FOUND BALIKPAPAN BETWEEN MIDNIGHT AND 01:45. BOMBING BETWEEN 5,000 AND 8,500 FEET, THEY CLAIMED FORTY-EIGHT HITS, WITH ONE MEDIUM-SIZED VESSEL AFIRE AND SEVEN OIL TANKS EXPLODING. ONE AIRCRAFT CRASH-LANDED ON RETURN, BUT THERE WERE NO AIRCREW LOSSES.<sup>212</sup> JAPANESE REPORTS DID NOT JUSTIFY THE CREWS' ENTHUSIASM, AS THEY CLAIMED ONLY MINOR DAMAGE, INCLUDING HOLED OIL TANKS IN THE OLD COMPLEX, WHICH "DID NOT CRITICALLY AFFECT THE REFINERY."<sup>213</sup> ALLIED AIR FORCES CONDUCTED FURTHER SPORADIC OPERATIONS AGAINST BALIKPAPAN OVER THE NEXT YEAR. THIS INCLUDED THE APRIL 1944 MINING OF BALIKPAPAN BAY BY THE CATALINAS OF THE ROYAL AUSTRALIAN AIR FORCE'S 43 SQUADRON. THE MINES CLOSED THE HARBOR FOR NINE DAYS AND APPARENTLY SANK THE JAPANESE DESTROYER *AMAKIRI*.<sup>214</sup> THESE EARLY RAIDS WERE, HOWEVER, MORE OF AN IRRITANT THAN A HINDRANCE TO THE REFINERY OPERATIONS AT BALIKPAPAN. NEVERTHELESS, THEY PROVIDED FEAFF WITH A BASELINE OF AIRCRAFT PERFORMANCE, TARGET, AND THREAT DATA WHICH PLANNERS ADAPTED TO LARGE-SCALE OPERATIONS.

IN THE SUMMER OF 1944, THEREFORE, FEAFF WAS A COMBAT ORGANIZATION READY TO TAKE ON NEW CHALLENGES. FEAFF'S SUBORDINATE ORGANIZATIONS HAD PROVED THEMSELVES IN COMBAT, WINNING THE AIR OPERATIONS IN THE SOLOMONS AND NEW GUINEA CAMPAIGNS. FEAFF HAD ALSO DESIGNED ITSELF TO BE AN ADAPTIVE ORGANIZATION, BOTH IN TERMS OF EQUIPMENT AND FORCE STRUCTURE. YET, IT REMAINED TO BE SEEN HOW WELL FEAFF MIGHT TAKE TO A NEW TYPE OF OPERATION: LONG-RANGE, INDEPENDENT STRATEGIC BOMBING.

#### DOCTRINAL UNDERPINNING, PLANNING, AND PREPARATION FOR OPERATIONS AGAINST BALIKPAPAN

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<sup>211</sup> JAMES A. WINNEFELD AND DANA J. JOHNSON. *JOHN AIR OPERATIONS: PURSUIT IN UNITY IN COMMAND AND CONTROL, 1942-1991* (ANNAPOLIS, MD: NAVAL INSTITUTE PRESS, 1993), 23-38.

<sup>212</sup> Craven and Cate, vol. 4, 169-170.

<sup>213</sup>"INTERROGATION OF VICE ADMIRAL MORITA, K., AND MIZOTA, S. INTERPRETER, NAVY MINISTRY IN CHARGE OF ENGLISH," FILE 51.B(22)(K), NAVAL OIL SUPPLY – BORNEO, PACIFIC SURVEY, GENERAL RECORDS, RECORDS OF THE US STRATEGIC BOMBING SURVEY, RG 243, NATIONAL ARCHIVES AT COLLEGE PARK, COLLEGE PARK, MD; DE BLANK, 6.

<sup>214</sup> Craven and Cate, vol. 4, 601-602.

THE BALIKPAPAN OPERATION SPRANG FROM THE SAME DOCTRINAL SOURCE AS THE PLOESTI STRIKES. AT FIRST BLUSH, BALIKPAPAN SEEMED AN OBVIOUS KEY NODE TO THE JAPANESE WAR MACHINE. IN THE MINDS OF SOME, BALIKPAPAN WAS THE FIRST TRULY STRATEGIC TARGET TO COME WITHIN RANGE OF SUSTAINED HEAVY BOMBARDMENT. HOWEVER, TWO YEARS OF DEBATE OVER REFINERY'S IMPORTANCE REVEALED MAJOR DIFFERENCES BETWEEN PLANNERS IN WASHINGTON AND THOSE IN THE FIELD. THE ARGUMENTS OVER BALIKPAPAN WERE COMPLICATED BY THE FACT THAT FINAL JUDGMENTS AFFECTED FORCE STRUCTURE AND AIR STRATEGY THROUGHOUT THE PACIFIC. UNABLE TO CONVERT THE AIR STAFF TO ITS VIEWPOINT, FEAFF PRESSED AHEAD WITH A REFINERY ATTACK USING THE RESOURCES ALREADY AVAILABLE.

THE IDEA OF ATTACKING THE JAPANESE PETROLEUM INDUSTRY SURFACED IN WASHINGTON D.C. AS EARLY AS 15 JULY 1942. A STUDY FOR ROBERT LOVETT, THE ASSISTANT SECRETARY OF WAR FOR AIR, EMPHASIZED JAPAN'S LACK OF REFINING CAPACITY, POSTULATING "JAPAN IS PROBABLY MORE DEPENDENT ON GASOLINE AND OIL IN STORAGE THAN ANY OTHER COUNTRY IN THE WORLD." THE STUDY CONCLUDED THAT OIL TARGETS "MAY POSSIBLY BE THE ACHILLES HEEL OF THE ENEMY."<sup>215</sup> OFFICERS WRITING AIR WAR PLANS DIVISION 42 (AWPD-42), THE AAF'S ROADMAP FOR STRATEGY AND FORCE STRUCTURE IN THE WAR, BELIEVED "JAPAN CAN OBTAIN AMPLE CRUDE OIL FROM THE NETHERLANDS EAST INDIES, BUT HAS ONLY A SMALL EXCESS OF REFINING CAPABILITY, WHICH CAN EASILY BE MADE THE SERIOUS BOTTLENECK IN HER PETROLEUM POSITION." THE WAR PLAN STATED THAT THE EASILY IDENTIFIABLE REFINERIES WERE HIGHLY VULNERABLE TO AERIAL ATTACK. TURNING TO SPECIFIC TARGETS, AWPD-42 CORRECTLY ASSESSED THAT PALEMBANG WAS THE HUB OF REFINING CAPABILITY IN SOUTHEAST ASIA.<sup>216</sup> THE COMMITTEE OF OPERATIONS ANALYSTS SECONDED THIS VIEW, ASSESSING THAT THE "PALDJOE [PALEMBANG] REFINERY REMAINS BY FAR THE MOST IMPORTANT INSTALLATION IN THE OIL INDUSTRY," PRODUCING "32 PERCENT OF THE INDIES FUEL OIL."<sup>217</sup> THE COA REPORTED TO GENERAL LAWRENCE KUTER THAT THE "LOSS OF BALIKPAPAN REFINING FACILITIES, WHILE TEMPORARILY EMBARRASSING TO JAP IN SUPPLYING NEARBY AREAS, WOULD NOT HAVE DRASTIC LONGER RANGE EFFECT."<sup>218</sup> FROM THE BEGINNING, HOWEVER, THE COA SAW BOMBING EVEN THE LARGEST REFINERIES AS A SECONDARY MEANS OF ATTACKING THE JAPANESE PETROLEUM SYSTEM. INSTEAD, THE COA ARGUED THAT SO "LONG AS JAPAN RETAINS THE NETHERLANDS EAST INDIES, HER ONLY VULNERABLE

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<sup>215</sup> WILLIAM D. KENNEDY, "PLANNING THE LONG-RANGE BOMBING OF JAPAN'S WAR ECONOMY," 15 JANUARY 1942, FILE 384.3, BLOCKADES OR BOMBARDMENTS, CLASSIFIED DECIMAL FILE 1940-1946, OFFICE, ASSISTANT SECRETARY OF WAR FOR AIR, RECORD GROUP 107, NATIONAL ARCHIVES AT COLLEGE PARK, COLLEGE PARK, MD.

<sup>216</sup> AIR WAR PLANS DIVISION 42, TAB B-4-B "AIR OPERATIONS – FAR EAST – 2<sup>ND</sup> PHASE – AIR OFFENSIVE, APPENDIX J.VI – OIL.

<sup>217</sup> Committee of Operations Analysts, *Revision of Report to Committee of Operations Analysts by Subcommittee on Far Eastern Petroleum Including Aviation Gasoline Supplement*, 1 May 1944, file 118.04D, Air Force Historical Research Agency, Maxwell Air Force Base, AL.

<sup>218</sup> GENERAL LAWRENCE KUTER TO GENERAL H. H. ARNOLD, LETTER NO. K-0765, 2 APRIL 1944, GENERAL GEORGE C. KENNEY PAPERS, VOLUME VIII, 1 JANUARY 1944 TO 25 JUNE 1944, AIR FORCE HISTORY SUPPORT OFFICE, BOLLING AIR FORCE BASE, WASHINGTON, D.C.

SPOT IN THE FIELD OF PETROLEUM IS TANKERS. HER POSITION WITH RESPECT TO THESE SHIPS IS PRECARIOUS AND THEY CONSTITUTE A FIRST PRIORITY TARGET.”<sup>219</sup>

DURING THE FIRST TWO YEARS OF THE WAR, THE VIEW FROM SWPA FOLLOWED THE SAME GENERAL LINES AS AWPD-42. AS EARLY AS OCTOBER 1942, KENNEY PROMULGATED A STRATEGY OF STRANGLING THE JAPANESE OF THEIR SOUTHERN RESOURCES. HE ARGUED TO ARNOLD THAT THE SOUTHWEST PACIFIC SHOULD BE GIVEN PRIORITY DIRECTLY BEHIND EUROPE “TO PREVENT JAPAN FROM EXPLOITING AND UTILIZING THE VITAL RESOURCES OF THE NETHERLANDS EAST INDIES AND MALAYA” WITHOUT WHICH THEY WOULD BE UNABLE TO CONTINUE THE WAR.<sup>220</sup> IN A MORE DETAILED ASSESSMENT A YEAR LATER, KENNEY ARGUED TO ARNOLD THAT THE KEY TO THE PACIFIC WAR WAS “TO DEPRIVE JAPAN OF THE ONE ESSENTIAL COMMODITY WHICH SHE MUST HAVE TO CARRY ON THE WAR—OIL.” KENNEY FELT THAT THE DESTRUCTION OF SOUTHERN AREA PETROLEUM RESOURCES AND THE RAPID ADVANCE TO THE PHILIPPINES COULD RESULT IN JAPAN’S TOTAL COLLAPSE. AT THIS STAGE, KENNEY AGREED WITH THE AIR STAFF’S ANALYSIS OF PETROLEUM PRIORITIES, STATING THAT PALEMBANG WAS THE “BIG TARGET,” PROVIDING AT LEAST HALF OF THE OUTPUT, WITH NORTHERN SUMATRA AND BORNEO OFFERING LESS PROMISING OBJECTIVES.<sup>221</sup>

HOWEVER, KENNEY BEGAN TO PRIORITIZE THESE DIFFERENTLY OVER THE NEXT YEAR, LEADING TO A DIRECT CONFLICT WITH THE AIR STAFF. KENNEY FIRST QUESTIONED PALEMBANG’S PRIMACY AFTER REVIEWING INTELLIGENCE STEMMING FROM THE 13 AUGUST 1943 NIGHT RAID ON BALIKPAPAN. THIS INTELLIGENCE INDICATED THAT WITHIN WEEKS THE “JAPS WERE SHORT OF AVIATION FUEL AT ALL OF THEIR FIELDS FROM AMBON TO WEWAK AND EVEN AT PALAU AND TRUK.”<sup>222</sup> BY MARCH 1944, KENNEY’S VIEWS HAD COMPLETELY CHANGED. DURING AN AIR STAFF VISIT TO THE THEATER, KENNEY PRESENTED GENERAL KUTER WITH A REPORT FROM HIS AIR INTELLIGENCE SECTION CLAIMING THAT BALIKPAPAN WAS THE KEY OIL FACILITY IN THE SOUTH PACIFIC. ACCORDING TO KENNEY:

ANALYSIS OF THE AMOUNT OF SHIPPING ENTERING AND DEPARTING FROM THE TWO PORTS [BALIKPAPAN AND PALEMBANG] LEAVES NO ROOM FOR DOUBT. BALIKPAPAN IS DEFINITELY THE MOST IMPORTANT OF THE OIL TARGETS. FURTHERMORE, THERE IS PLENTY OF EVIDENCE TO INDICATE THAT CRUDE OIL IS ACTUALLY BEING SHIPPED FROM THE PALEMBANG AREA TO BALIKPAPAN FOR REFINING. OUR ESTIMATE HERE – WHICH IS AGREED TO BY THE NAVY – IS THAT APPROXIMATELY SEVENTY PERCENT OF THE

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<sup>219</sup> Committee of Operations Analysts, *Report of the Committee of Operations Analysts on Economic Objectives in the Far East*, 11 November 1943, file 118.04D, Air Force Historical Research Agency, Maxwell Air Force Base, AL.

<sup>220</sup> LIEUTENANT GENERAL GEORGE C. KENNEY, USA, COMMANDER FIFTH AIR FORCE, TO GENERAL H. H. ARNOLD, COMMANDING GENERAL ARMY AIR FORCES, LETTER, 29 OCTOBER 1942, GENERAL GEORGE C. KENNEY PAPERS, VOLUME II, AIR FORCE HISTORY SUPPORT OFFICE, BOLLING AIR FORCE BASE, WASHINGTON, D.C.

<sup>221</sup> LIEUTENANT GENERAL GEORGE C. KENNEY, USA, COMMANDER FIFTH AIR FORCE, TO GENERAL H. H. ARNOLD, COMMANDING GENERAL ARMY AIR FORCES, LETTER, 29 OCTOBER 1943, GENERAL GEORGE C. KENNEY PAPERS, VOLUME VI, AIR FORCE HISTORY SUPPORT OFFICE, BOLLING AIR FORCE BASE, WASHINGTON, D.C.

<sup>222</sup> Craven and Cate, vol. 5, 316.

AVIATION FUEL USED BY THE JAP ARMY AND NAVAL AIR FORCES IS COMING FROM  
BALIKPAPAN.<sup>223</sup>

UNFORTUNATELY, POST-WAR ANALYSIS OF THE JAPANESE OIL SYSTEM DISPROVED ALL OF THESE  
ASSERTIONS.

THE INTERPRETATION OF THE REFINERY DATA WAS CRUCIAL, SINCE KENNEY WAS USING  
BALIKPAPAN AS THE PRIMARY JUSTIFICATION FOR THE ASSIGNMENT OF B-29S TO FEAF. DISCUSSION  
CONCERNING THE DISPOSITION OF THE SUPERFORTRESSES BEGAN AS EARLY AS JULY 1943, WHEN  
KENNEY ASKED ARNOLD FOR PERFORMANCE, BASING, AND LOGISTICS DATA, SINCE "I ASSUME THAT I AM  
STILL TO GET THE FIRST B.29 UNIT."<sup>224</sup> ARNOLD'S REPLY WAS EQUIVOCAL, STATING NO B-29 UNITS WERE  
SCHEDULED FOR THE SOUTHWEST PACIFIC AREA BEFORE JUNE 1944 AND THAT THEIR SUBSEQUENT  
ALLOCATION HAD NOT YET BEEN DECIDED.<sup>225</sup> WHEN ARNOLD ASKED KENNEY FOR DETAILS ON HOW HE  
WOULD USE B-29S, KENNEY, IN A LETTER OF 29 OCTOBER 1943, PROPOSED ATTACKS AGAINST THE  
BORNEO OIL CENTERS.<sup>226</sup> OPTIMISTIC THAT HIS ARGUMENTS WOULD SWAY ARNOLD, KENNEY  
IMMEDIATELY DIRECTED HIS STAFF TO EXAMINE BASING AND LOGISTICAL SUPPORT FOR THE BOMBERS IN  
NORTHWEST AUSTRALIA.<sup>227</sup>

KENNEY'S HOPES WERE SOON DASHED, HOWEVER. ON 18 NOVEMBER 1943, GENERAL BARNEY  
M. GILES, THE AAF CHIEF OF STAFF, INFORMED KENNEY OF GENERAL ARNOLD'S DECISION NOT TO BASE  
B-29S IN THE SOUTHWEST PACIFIC IN WHAT WAS INEVITABLY "A KEEN DISAPPOINTMENT TO YOU." GILES  
ATTEMPTED TO SOFTEN THE BLOW, OFFERING THAT THIS WAS "IN NO WAY A DENIAL THAT THESE  
AIRPLANES COULD BE USED WITH TELLING EFFECT IN THE SW PACIFIC AREA WERE IT PRACTICABLE TO  
PROVIDE YOU WITH THEM."<sup>228</sup> UNDAUNTED, KENNEY OFFERED UP A VARIETY OF ALTERNATE SCHEMES,

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<sup>223</sup> LIEUTENANT GENERAL GEORGE C. KENNEY, USA, COMMANDER FAR EAST AIR FORCES, TO  
GENERAL H. H. ARNOLD, COMMANDING GENERAL ARMY AIR FORCES, 1 APRIL 1944, GENERAL GEORGE  
C. KENNEY PAPERS, VOLUME VIII, 1 JANUARY 1944 TO 25 JUNE 1944, AIR FORCE HISTORY SUPPORT  
OFFICE, BOLLING AIR FORCE BASE, WASHINGTON, D.C.

<sup>224</sup> LIEUTENANT GENERAL GEORGE C. KENNEY, USA, COMMANDER FIFTH AIR FORCE, TO GENERAL H.  
H. ARNOLD, COMMANDING GENERAL ARMY AIR FORCES, 28 JULY 1943, GENERAL GEORGE C. KENNEY  
PAPERS, VOLUME VI, AIR FORCE HISTORY SUPPORT OFFICE, BOLLING AIR FORCE BASE, WASHINGTON,  
D.C.

<sup>225</sup> GENERAL H. H. ARNOLD, COMMANDING GENERAL ARMY AIR FORCES, TO LIEUTENANT GENERAL  
GEORGE C. KENNEY, USA, COMMANDER FIFTH AIR FORCE, 31 AUGUST 1943, GENERAL GEORGE C.  
KENNEY DIARIES, VOLUME VI, AIR FORCE HISTORY SUPPORT OFFICE, BOLLING AIR FORCE BASE,  
WASHINGTON, D.C.

<sup>226</sup> LIEUTENANT GENERAL GEORGE C. KENNEY, USA, COMMANDER FIFTH AIR FORCE, TO GENERAL H.  
H. ARNOLD, COMMANDING GENERAL ARMY AIR FORCES, 29 OCTOBER 1943, GENERAL GEORGE C.  
KENNEY PAPERS, VOLUME VI, AIR FORCE HISTORY SUPPORT OFFICE, BOLLING AIR FORCE BASE,  
WASHINGTON, D.C.

<sup>227</sup> LIEUTENANT GENERAL GEORGE C. KENNEY, USA, COMMANDER FIFTH AIR FORCE, TO COLONEL V.  
E. BERTRANDIS, AIR SERVICE COMMAND ADVANCED ECHELON, 30 OCTOBER 1943, GENERAL GEORGE  
C. KENNEY PAPERS, VOLUME VI, AIR FORCE HISTORY SUPPORT OFFICE, BOLLING AIR FORCE BASE,  
WASHINGTON, D.C.

<sup>228</sup> MAJOR GENERAL BARNEY M. GILES, USA, CHIEF OF STAFF, ARMY AIR FORCES, TO LIEUTENANT  
GENERAL GEORGE C. KENNEY, COMMANDING GENERAL, FIFTH AIR FORCE, 18 NOVEMBER 1943,

INCLUDING BORROWING XXI BOMBER COMMAND UNITS AWAITING MOVEMENT AND SERVICING XX BOMBER COMMAND B-29S ON OUT-AND-BACK MISSIONS FROM CHINA. THE AAF REFUSED ALL OF THESE REQUESTS.<sup>229</sup>

UNABLE TO GET THE OPTIMUM TOOL FOR THE JOB, KENNEY DESIGNED A BALIKPAPAN ATTACK USING THE ASSETS AVAILABLE. WHAT FEAF CONTROLLED, OF COURSE, WERE THE FIVE B-24 GROUPS WHICH MOVED INTO RANGE OF THE REFINERIES IN SEPTEMBER 1944. FEAF COULD NOT CONCENTRATE ALL OF ITS ATTENTION ON BALIKPAPAN, AS SWPA WAS PREPARING FOR THE RETURN TO THE PHILIPPINES. REGARDLESS, KENNEY PRESSED AHEAD WITH THE OPERATION, FEELING THAT STRIKES WOULD HAVE IMPORTANT NEAR-TERM OPERATIONAL EFFECTS. KENNEY SURMISED THAT THE DESTRUCTION OF THE OIL REFINERIES WOULD REDUCE AVIATION FUEL TO THE PHILIPPINES, GROUNDING THE JAPANESE AIR FORCE DURING THE INVASION. FEAF UNDERSTOOD THAT TIMING WAS CRITICAL FOR THIS TASK, AS THEY CALCULATED THAT REFINERIES WOULD NEED TO BE IDLE SEVERAL MONTHS PRIOR TO THE INVASION TO EXHAUST THE JAPANESE STOCKPILES. FOR THIS REASON, WHITEHEAD RECOMMENDED CANCELING THE OPERATION WHEN THE PHILIPPINE INVASION DATE WAS SUDDENLY ADVANCED FROM THE END OF DECEMBER TO 20 OCTOBER 1944.<sup>230</sup> KENNEY DID NOT CANCEL THE OPERATION, AS HE STILL FELT THAT THE DESTRUCTION OF BALIKPAPAN COULD HAVE IMMEDIATE STRATEGIC EFFECTS. IN A DIARY ENTRY TWO WEEKS PRIOR TO THE FIRST RAID, KENNEY CONJECTURED THAT "IF WE SMASH BALIKPAPAN AND 2 WEEKS LATER LAND IN MINDANAO, THEY MAY GET A NEW CABINET WHICH ASKS FOR TERMS."<sup>231</sup>

IF KENNEY FELT ANY RESERVATIONS ABOUT BOMBING BALIKPAPAN, THEY MOSTLY CONCERNED DEFENSES. ORIGINALLY, KENNEY THOUGHT BALIKPAPAN'S ROBUST DEFENSES WOULD CAUSE PROHIBITIVE LOSSES.<sup>232</sup> HOWEVER, KENNEY'S VIEW OF JAPANESE AIR CAPABILITIES CHANGED AFTER THEIR FEEBLE AIRFIELD DEFENSE IN THE HALMAHERAS. KENNEY FELT "THIS EXPERIENCE LEFT EVERYONE CONTEMPTUOUS OF THE CAPABILITIES OF THE NIP AIR FORCE"<sup>233</sup> TO HIS DIARY, HE CONFIDED THAT "JAP AIR IS SHOT" IN THE THEATER.<sup>234</sup> THEREFORE, FEAF PRESSED AHEAD WITH THE PLANNING, EVEN THOUGH BALIKPAPAN WAS BEYOND THE RANGE OF AMERICAN FIGHTERS. THIS CAVALIER ATTITUDE EXTENDED DOWN THE CHAIN OF COMMAND, AS "THIRTEENTH AIR FORCE, USED TO UNESCORTED MISSIONS, WAS NOT PARTICULARLY APPREHENSIVE AT FIRST."<sup>235</sup> THE AMERICANS WERE UNAWARE THAT,

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DOCUMENT #35, SOUTH PACIFIC FILE, 370.2, AAG, THE PAPERS OF HENRY H. ARNOLD, LIBRARY OF CONGRESS, WASHINGTON, D.C.

<sup>229</sup> STANLEY L. FALK, "GENERAL KENNEY, THE INDIRECT APPROACH, AND THE B-29S," *AEROSPACE HISTORIAN* 27, NO. 3 (FALL/SEPTEMBER 1981): 153-154; CRAVEN AND CATE, VOL. 5, 316.

<sup>230</sup> Griffith, 182.

<sup>231</sup> GENERAL GEORGE C. KENNEY, DIARY, GEORGE C. KENNEY PAPERS, AIR FORCE HISTORY SUPPORT OFFICE, BOLLING AIR FORCE BASE, WASHINGTON, D.C., 14 SEPTEMBER 1944.

<sup>232</sup> Griffith, 181.

<sup>233</sup> GEORGE C. KENNEY, *GENERAL KENNEY REPORTS: A PERSONAL HISTORY OF THE PACIFIC WAR* (WASHINGTON D.C.: OFFICE OF AIR FORCE HISTORY, 1987), 174.

<sup>234</sup> Kenney, diary, 12 September 1944.

<sup>235</sup> Craven and Cate, vol. 5, 317.



IN PART, THE DIMINISHING JAPANESE AIR DEFENSES RESULTED FROM A CONSCIOUS DECISION BY THE JAPANESE TO PRESERVE ASSETS FOR THE DEFENSE OF THE REFINERIES.<sup>236</sup>

THE LAST HALF OF SEPTEMBER SAW A FLURRY OF ACTIVITY IN PREPARATION FOR THE BALIKPAPAN RAIDS. FEAF ORIGINALLY INTENDED TO LAUNCH THE STRIKES FROM MAR AIRDROME AT SANSAPOR ONCE THE ENGINEERS IMPROVED THE RUNWAYS. HOWEVER, STREET ARGUED THAT THIRTEENTH AIR FORCE COULD LAUNCH THE STRIKES EARLIER FROM NEOMFOOR, 1,080 NAUTICAL MILES FROM THE OIL TARGETS. AS A RESULT, KENNEY NAMED THIRTEENTH AIR FORCE THE LEAD ORGANIZATION FOR THE RAIDS AND DIRECTED FIFTH AIR FORCE TO SUPPORT THE OPERATION. STREET MOVED THE THIRTEENTH AIR FORCE COMMAND POST, XIII BOMBER COMMAND, AND ITS TWO B-24 GROUPS TO KORNASOREN AIRFIELD, NOEMFOOR, BETWEEN 18 AND 28 SEPTEMBER 1944. THIRTEENTH AIR FORCE LOGISTICIANS ARRANGED FOR SPECIAL SHIPMENTS OF OIL AND B-24 TIRES TO SUPPORT THE LARGE NUMBER OF SORTIES. ADDITIONALLY, XIII BOMBER COMMAND COMMANDEERED AND CAREFULLY ALLOCATED ALL SERVICE PERSONNEL AND EQUIPMENT ON THE ISLAND TO SUPPLEMENT THE INADEQUATE NUMBER OF ORDNANCE PERSONNEL.<sup>237</sup>

WHILE XIII BOMBER COMMAND PREPARED THE SUPPORT INFRASTRUCTURE, THE BOMB GROUPS CONDUCTED CAREFUL TESTS TO DETERMINE HOW TO MAXIMIZE THE RANGE AND PAYLOAD FOR EACH AIRCRAFT. THE RESULT WAS A SET OF RIGID CRUISE CHARTS, DIRECTING POWER SETTINGS, MANIFOLD PRESSURE, FUEL TRANSFER, AND THE POSITION OF AIRCREW MEMBERS DURING EACH PHASE OF FLIGHT. THE INCREASED FUEL LOAD REQUIRED REMOVING SOME STANDARD EQUIPMENT FROM THE B-24S. THIRTEENTH AIR FORCE SOLVED THE PROBLEM BY CARRYING ONLY 40% OF THE NORMAL AMMUNITION AND FLYING OVERLOADED. FIFTH AIR FORCE, IN CONTRAST, REMOVED ARMOR PLATE AND THE LOWER TURRET WHILE RETAINING A FULL AMMUNITION LOAD FOR THE REMAINING GUNS. THE THIRTEENTH AIR FORCE'S 5<sup>TH</sup> AND 307<sup>TH</sup> BOMB GROUPS THEN VALIDATED THE LONG-RANGE CONFIGURATIONS AND PROCEDURES ON FLIGHTS OVER FRIENDLY TERRITORY. MEANWHILE, FEAF PREPARED FOR SEARCH AND RESCUE SUPPORT AND PRE- AND POST-STRIKE PHOTOGRAPHIC RECONNAISSANCE. MOST IMPORTANTLY, FEAF SCHEDULED AIR STRIKES AGAINST THE JAPANESE AIRFIELDS ALONG THE ROUTE TO BORNEO DURING THE LAST WEEK OF SEPTEMBER. FEAF WAS PREPARED FOR A SUSTAINED OPERATION, PLANNING TO REVISIT BALIKPAPAN EVERY FOUR DAYS UNTIL THE BOMBERS MET THEIR OBJECTIVES.<sup>238</sup>

#### THE 30 SEPTEMBER 1944 MISSION

FEAF CONDUCTED THE FIRST BALIKPAPAN MISSION ON THE LAST DAY OF SEPTEMBER 1944. THE DESIGN OF THE MISSION DEMONSTRATED THE CAVALIER AMERICAN MIND-SET ABOUT THE JAPANESE DEFENSES. FEAF UTILIZED ONLY HALF OF ITS B-24 GROUPS, WHICH FLEW UNESCORTED AND WITH ONLY

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<sup>236</sup> The United States Strategic Bombing Survey, Military Analysis Division, 12

<sup>237</sup> Air Evaluation Board, 43.

<sup>238</sup> Craven and Cate, vol. 5, 316-317; Air Evaluation Board, 9-12.

LIMITED COORDINATION. AIR COMMANDERS WERE STARTLED BY THE RESULTS, AS THE BOMBERS ACHIEVED MEAGER BOMBING RESULTS WHILE SUFFERING HEAVILY FROM STIFF OPPOSITION.

MISSION PREPARATION BEGAN AS SOON AS THE THIRTEENTH AIR FORCE GROUPS SETTLED IN AT NOEMFOOR. FEAF ASSIGNED THIS FIRST MISSION TO BOTH THIRTEENTH AIR FORCE GROUPS (5<sup>TH</sup> AND 307<sup>TH</sup>) AND THE 90<sup>TH</sup> BOMB GROUP FROM THE FIFTH AIR FORCE.<sup>239</sup> THE 90<sup>TH</sup> GROUP STAGED ITS AIRCRAFT UP FROM BIAK THE DAY PRIOR TO THE RAID, AND ALL THREE GROUPS FINE-TUNED EQUIPMENT, PARTICULARLY ENGINES AND AUTOPILOTS, DURING THE NIGHT.<sup>240</sup> REPRESENTATIVES FROM THE NMOIS CONSULTED ON THE SELECTION OF AIM POINTS WITHIN THE REFINERIES, TO WHICH THIRTEENTH AIR FORCE ADDED JAPANESE AIRFIELDS AS BACK-UP TARGETS. TO MAXIMIZE ACCURACY, XIII BOMBER COMMAND DIRECTED EACH GROUP TO BOMB BY SECTIONS OF TWO SQUADRONS.<sup>241</sup> THE MOST SIGNIFICANT DIFFERENCE BETWEEN THE GROUPS CONCERNED WEAPONS CHOICES. THE XIII BOMBER COMMAND GROUPS, REFERENCING DATA FROM THE PLOESTI MISSIONS, CHOSE TO USE SMALLER BOMBS TO ENSURE WIDE AREA COVERAGE. THE 90<sup>TH</sup> BOMB GROUP, ON THE OTHER HAND, LOADED HEAVIER ORDNANCE AND DEPENDED ON PRECISION AIMING TO DESTROY ITS OBJECTIVES.<sup>242</sup>

STARTING AT APPROXIMATELY 1:00 ON 30 SEPTEMBER, THE BOMBERS TOOK OFF FROM NOEMFOOR AT ONE-AND-A-HALF MINUTE INTERVALS.<sup>243</sup> SEVENTY-THREE AIRCRAFT MADE IT AIRBORNE, WITH THE 5<sup>TH</sup> BOMB GROUP IN THE LEAD, THE 307<sup>TH</sup> BOMB GROUP NEXT IN ORDER, AND THE 90<sup>TH</sup> BOMB GROUP IN THE TRAIL POSITION.<sup>244</sup> THE AIRCRAFT PROCEEDED INDIVIDUALLY TO THE CAPE KARANG RENDEZVOUS POINT IN ORDER TO SAVE FUEL.<sup>245</sup> AFTER THE RENDEZVOUS, THE BOMBERS FLEW IN LOOSE FORMATION TO ALLOW THE USE OF AUTOPILOTS, PLANNING TO CLOSE RANKS QUICKLY IF INTERCEPTED.<sup>246</sup> THE FIRST SIGN OF THE ENEMY APPEARED AT THE COAST OF THE CELEBES, WHEN TWO J1N1-S GEKKO NIGHT FIGHTERS FROM MANADO, CELEBES INTERCEPTED AND TRAILED THE FORMATION. THESE AIRCRAFT ALERTED THE BALIKPAPAN AIR DEFENSES ABOUT THE APPROACHING RAID.<sup>247</sup>

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<sup>239</sup> Craven and Cate, vol. 5, 318.

<sup>240</sup> Craven and Cate, vol. 5, 318; Condon, 2.

<sup>241</sup> Air Evaluation Board, 11, 15.

<sup>242</sup> Craven and Cate, vol. 5, 318; Air Evaluation Board, 12.

<sup>243</sup> 424<sup>th</sup> Bombardment Squadron, "Narrative Combat Report of Mission #307-337," 30 September 1944, in 424<sup>th</sup> Bombardment Squadron History, September 1944, file Sq-Bomb-424-Hi, Sept 1944, Air Force Historical Research Agency, Maxwell Air Force Base, AL; Craven and Cate, vol. 5, 318.

<sup>244</sup> FAR EAST AIR FORCES, TABLE, "NUMBER OF AIRBORNE & COMPLETED SORTIES AGAINST BALIKPAPAN," FILE 732.308.5, AIR FORCE HISTORICAL RESEARCH AGENCY, MAXWELL AIR FORCE BASE, AL; CRAVEN AND CATE, VOL. 5, 318.

<sup>245</sup> 424<sup>th</sup> Bombardment Squadron History, September 1944, Field Order, 29 September 1944; Air Evaluation Board, 14.

<sup>246</sup> Condon, 3.

<sup>247</sup> UCHIDA, "THE ZERO MAYOR' KUROSAWA, TAKEO," N.P.; SMITHSONIAN NATIONAL AIR AND SPACE MUSEUM, "NAKAJIMA J1N1-S GEKKO 'IRVING,'" N.P., ON-LINE, INTERNET, 27 MARCH 2005, AVAILABLE FROM [HTTP://WWW.NASM.SI.EDU/RESEARCH/AERO/AIRCRAFT/NAKAIRVING.HTM](http://www.nasm.si.edu/research/aero/aircraft/nakaierving.htm); CONDON, 3; CRAVEN AND CATE, VOL. 5, 318.

SIXTY-FOUR B-24S ARRIVED OVER THE TARGET NINE-AND-A-HALF HOURS AFTER TAKE-OFF AND FOUND THAT LITTLE WENT AS PLANNED.<sup>248</sup> THE WEATHER STEADILY DETERIORATED DURING THE ATTACK, SO THE GROUPS SPLIT INTO INDIVIDUAL SQUADRONS, EACH ARRAYED IN A JAVELIN-DOWN FORMATION, TO SEARCH FOR CLEARINGS TO BOMB THROUGH. SOME GROUPS SPENT AS MUCH AS FORTY-FIVE MINUTES IN THE TARGET AREA.<sup>249</sup> THE 5<sup>TH</sup> BOMB GROUP, IN THE LEAD, HAD PERHAPS THE EASIEST TIME BOMBING, DROPPING VISUALLY ON THE PANDASARI REFINERY AFTER A LAST MINUTE HEADING CHANGE TO AVOID CUMULOUS CLOUDS.<sup>250</sup> UNFORTUNATELY, THESE SAME KEN'S MEN OF THE 5<sup>TH</sup> BOMB GROUP BORE THE BRUNT OF AERIAL DEFENSES. JAPANESE FIGHTERS INTERCEPTED THE GROUP FIFTEEN MINUTES PRIOR TO THE TARGET, AND CONTINUED TO ENGAGE THE GROUP FOR APPROXIMATELY AN HOUR. THE CREWS DESCRIBED THE ATTACKS AS "EAGER PASSES" FROM MOSTLY THE REAR AND HIGH. MOST DISCONCERTING, THE 5<sup>TH</sup> WAS THE FIRST GROUP TO FACE THE JAPANESE AIR-TO-AIR PHOSPHORUS BOMBS.<sup>251</sup> THE BOMBER CREWS REPORTED THAT JAPANESE FIGHTERS EITHER DROPPED THESE BOMBS AS THEY PASSED THROUGH THE FORMATION IN HEAD-ON ATTACKS OR FROM LEVEL OR SLIGHTLY DIVING ATTACKS 100 TO 500 FEET ABOVE THE BOMBER FORMATION.<sup>252</sup> THE FIGHTERS DESTROYED ONE 5<sup>TH</sup> BOMB GROUP B-24 FIFTEEN MILES NORTHWEST OF BALIKPAPAN, WHILE THREE OTHER CREWS BAILED OUT OF THEIR CRIPPLED BOMBERS ALONG THE RETURN ROUTE. IN ADDITION, KEN'S MEN REPORTED THAT TWO SURVIVING BOMBERS SUFFERED SEVERE DAMAGE WHILE NINE OTHERS HAD MINOR HOLES.<sup>253</sup>

THE 307<sup>TH</sup> BOMB GROUP, ARRIVING FIVE MINUTES LATER, HAD MORE DIFFICULTY WITH CLOUDS. THE GROUP'S 424<sup>TH</sup> BOMB SQUADRON ABORTED THEIR FIRST WESTERLY PASS, TURNED SOUTH TO WORK AROUND CLOUDS, AND THEN SET UP A SOUTH TO NORTH RUN TO THE TARGET. IN THE END, THE SQUADRON "DROPPED ON A WELL DEFINED AIMING POINT WHICH SHOULD HAVE PUT THE BOMBS IN THE PARAFFIN PLANT," ALTHOUGH "CLOUD COVERAGE PREVENTED VERIFYING THIS."<sup>254</sup> THE 424<sup>TH</sup> WAS LUCKY TO HAVE EVEN THESE VISUAL REFERENCES, AS THE REST OF THE GROUP EITHER BOMBED BY RADAR OR DROPPED THROUGH THE UNDERCAST WITHOUT AIMING.<sup>255</sup> THE BULK OF THE JAPANESE INTERCEPTORS WERE APPARENTLY STILL OCCUPIED WITH THE LEAD GROUP, AS FIGHTER ATTACKS DID NOT START ON THE 307<sup>TH</sup> BOMB GROUP UNTIL TWENTY-FIVE MINUTES INTO THE AIR BATTLE AND LASTED ONLY FORTY-FIVE MINUTES. THE JAPANESE CONCENTRATED ON THE TWO LEAD SQUADRONS OF THE 307<sup>TH</sup>, ATTACKING

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<sup>248</sup> Far East Air Forces, "Number of Airborne and Completed Sorties against Balikpapan."; 424<sup>th</sup> Bombardment Squadron, 30 September 1944.

<sup>249</sup> Air Evaluation Board, 15.

<sup>250</sup> Craven and Cate, vol. 5, 318.

<sup>251</sup> THIRTEENTH AIR FORCE, "ENEMY INTERCEPTION OF 13TH A.F. AIRCRAFT, 16 SEP 1944-18 JAN 45" (750.3811-3. AIR FORCE HISTORICAL RESEARCH AGENCY, MAXWELL AIR FORCE BASE, AL).

<sup>252</sup> THIRTEENTH AIR FORCE, "ATTACKS AGAINST STRATEGIC ENEMY OIL CENTERS." (750.424-1. AIR FORCE HISTORICAL RESEARCH AGENCY, MAXWELL AIR FORCE BASE, AL), N.P..

<sup>253</sup> Thirteenth Air Force, *Enemy Interception of 13th A.F. Aircraft, 16 Sep 1944-18 Jan 45*, n.p.

<sup>254</sup> 424<sup>th</sup> Bomb Squadron, Narrative Combat Report of Mission #307-337," 30 September 1944.

<sup>255</sup> Air Evaluation Board, 68.

FROM "ALL AROUND THE CLOCK." HOWEVER, THE JAPANESE DID NOT COORDINATE THESE ATTACKS WELL, AND ONLY TWO BOMBERS SUFFERED DAMAGE.<sup>256</sup>

THE B-24S OF THE 90<sup>TH</sup> BOMB GROUP WERE THE LAST OVER THE TARGET, FINDING THE AREA TOTALLY OBSCURED. ONLY ONE OF THE SQUADRONS ATTEMPTED TO BOMB, AND ITS AIM WAS BASED ON ESTIMATED TIME OF ARRIVAL.<sup>257</sup> THE FIRST TWO SQUADRONS OF THE JOLLY ROGERS WERE LUCKY TO HAVE THE SAME LIGHT TREATMENT AS THE 307<sup>TH</sup> BOMB GROUP. FIVE FIGHTERS ENGAGED THIS SECTION, MAKING INEFFECTIVE GUN PASSES AND PHOSPHORUS BOMB DROPS. THE LAST TWO SQUADRONS OF THE RAID WERE NOT SO FORTUNATE. TWENTY-FIVE TO THIRTY-FIVE JAPANESE FIGHTERS ENGAGED THE TAIL-END B-24S JUST AS THEY CAME OFF TARGET. IN THE ENSUING THIRTY-MINUTE RUNNING BATTLE, ONE DAMAGED B-24 DROPPED OUT OF THE 90<sup>TH</sup> FORMATION AND WAS SWARMED AND DOWNED BY FIGHTERS. THE AGGRESSIVE INTERCEPTOR ATTACKS RESULTED IN TWO MORE JOLLY ROGERS SERIOUSLY DAMAGED, WHILE THREE SUFFERED MINOR DAMAGE.<sup>258</sup>

OVERALL, THE RESULTS OF THIS FIRST BALIKPAPAN RAID WERE TERRIBLY DISAPPOINTING. OF THE SIXTY-FOUR AIRCRAFT THAT BOMBED IN THE TARGET AREA, THIRTY-FOUR DROPPED VISUALLY THROUGH GAPS IN THE CLOUDS, SEVEN DROPPED BY RADAR, ELEVEN DROPPED THROUGH THE UNDERCAST, AND TWELVE DROPPED ON SEMOI VILLAGE AS A TARGET OF OPPORTUNITY. FOUR AIRCRAFT THAT WERE UNABLE TO DROP AT BALIKPAPAN BOMBED PALOE, CELEBES ON RETURN.<sup>259</sup> ALTHOUGH FEAF KNEW THE RESULTS FROM THIS TYPE OF BOMBING WERE GOING TO BE BAD, THEY HAD A DIFFICULT TIME ASSESSING THE DAMAGE. WITH WEATHER CLOSING OVER THE TARGET AS THE STRIKE PROGRESSED, THE ONLY INFORMATION THIRTEENTH AIR FORCE HAD WERE A FEW STRIKE PHOTOS SHOWING SOME HITS THROUGH GAPS IN THE CLOUDS.<sup>260</sup> HOWEVER, SINCE SOME BOMB GROUPS, THE 90<sup>TH</sup> IN PARTICULAR, REPORTED NO DAMAGE TO THEIR ASSIGNED TARGETS, IT WAS CLEAR THAT THE REFINERIES WERE STILL IN THE WAR.<sup>261</sup> WHAT FEAF COULD NOT KNOW WAS THAT THE PANDASARI REFINERY EXECUTED AN EMERGENCY SHUT-DOWN IN RESPONSE TO THE AIR RAID WARNING. THIS WAS A VERY DISRUPTIVE PROCEDURE, FROM WHICH THE REFINERY DID NOT RECOVER BEFORE LATER RAIDS DECIDED THE MATTER FOR GOOD.<sup>262</sup> WHATEVER THE RESULTS, FEAF PAID A HIGH PRICE. OF THE SIXTY-EIGHT B-24S OVER THE TARGET, TWO WERE DESTROYED AND TWENTY-ONE DAMAGED BY JAPANESE FIGHTERS, TWO WERE DESTROYED AND TWO DAMAGED BY ANTI-AIRCRAFT FIRE, AND TWO FUEL-HUNGRY AIRCRAFT WERE DESTROYED AND TWO MORE DAMAGED WHEN THEY ATTEMPTED TO RECOVER AT THE MOROTAI FIGHTER STRIP.<sup>263</sup> THESE LAST LOSSES WERE DIRECTLY ATTRIBUTABLE TO

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<sup>256</sup> Thirteenth Air Force, *Enemy Interception of 13th A.F. Aircraft, 16 Sep 1944-18 Jan 45*, n.p.

<sup>257</sup> Craven and Cate, vol. 5, 319.

<sup>258</sup> Thirteenth Air Force, *Enemy Interception of 13th A.F. Aircraft, 16 Sep 1944-18 Jan 45*, n.p.

<sup>259</sup> Air Evaluation Board, 68.

<sup>260</sup> Air Evaluation Board, 20B.

<sup>261</sup> V Bomber Command, n.p.

<sup>262</sup> DE BLANK, 1.

<sup>263</sup> Air Evaluation Board, 83.

THE UNEXPECTED ADDITIONAL BOMB RUNS NECESSITATED BY THE POOR WEATHER.<sup>264</sup> FOR THIS, THE BOMBERS CLAIMED 9 ENEMY INTERCEPTORS DESTROYED. THE JAPANESE AIR DEFENSE COMMANDER AT BALIKPAPAN, HOWEVER, CLAIMED THAT THE 381<sup>ST</sup> AIR GROUP LOST ONLY ONE J2M FIGHTER THAT DAY.<sup>265</sup> CLEARLY, FEAFF COULD NOT KEEP PRESSURE ON BALIKPAPAN WITH THIS LEVEL OF LOSS. UNFORTUNATELY FOR THE B-24 CREWS, THE WORST WAS YET TO COME.

### THE 3 OCTOBER MISSION

AS THE CREWS PREPARED FOR THE NEXT MISSION, THEY WERE RELIEVED THAT THEY WOULD NOT HAVE TO OVERCOME ONE SIGNIFICANT OBSTACLE: THE WEATHER. THE FORECAST CALLED FOR CLEAR CONDITIONS THROUGHOUT THE MORNING OF 3 OCTOBER. UNFORTUNATELY, THE JAPANESE, NOW WISE TO THE INTENTIONS OF FEAFF, WAITED WITH A STRONG RESPONSE. THE DISASTROUS RESULTS IN THIS RAID FORCED FEAFF TO RE-EVALUATE IT PLANS.

THIRTEENTH AIR FORCE EXECUTED THE NEXT RAID WITH JUST ITS OWN BOMB GROUPS. WITH SUCH SMALL FORCES, THE PLANNERS CONCENTRATED ON THE TWO MOST CRITICAL COMPONENTS OF THE FACILITY. XIII BOMBER COMMAND ASSIGNED PANDASARI TO THE 307<sup>TH</sup> BOMB GROUP AND EDELEANU TO THE 5<sup>TH</sup> BOMB GROUP. FOR THIS MISSION, THE GROUPS WERE TO BOMB SEPARATELY, WITH EACH GROUP DIVIDED INTO TWO-SQUADRON SECTIONS. EACH SECTION WAS TO EMPLOY A JAVELIN-DOWN FORMATION AND BOMB FROM 13,000 TO 15,000 FEET.<sup>266</sup>

FORTY AIRCRAFT LAUNCHED, WITH THE RELATIVELY UN-BLOODIED 307<sup>TH</sup> IN THE LEAD.<sup>267</sup> OF THESE, THIRTY-SIX B-24S ARRIVED AT THE RENDEZVOUS POINT.<sup>268</sup> MOST OF THE MISSING AIRCRAFT WERE FROM THE 307<sup>TH</sup> BOMB GROUP'S 424<sup>TH</sup> SQUADRON. OF THE SIX AIRCRAFT LAUNCHED BY THIS SQUADRON, ONE RETURNED FOR A DEFECTIVE AUTOPILOT AND TWO MISSED THE RENDEZVOUS DUE TO TIMING AND NAVIGATION ERRORS.<sup>269</sup>

NEARING BORNEO, THE TWENTY B-24S OF THE LEAD 307<sup>TH</sup> BOMB GROUP SPLIT INTO THE PLANNED BOMBING FORMATION. THEY SOON DISCOVERED THAT WHILE THE FEAFF BOMBER STRENGTH WAS ONLY HALF THAT OF THE PREVIOUS STRIKE, THE NUMBER OF JAPANESE INTERCEPTORS HAD DOUBLED TO APPROXIMATELY FIFTY AIRCRAFT.<sup>270</sup> ATTACKS STARTED TEN MINUTES PRIOR TO THE BOMB RUN, WITH THE INITIAL PASS RESULTING IN ANOTHER LOSS FROM THE LUCKLESS 424<sup>TH</sup> BOMB SQUADRON. A JAPANESE INTERCEPTOR RAMMED ONE OF THE SQUADRON'S B-24S IN THE RIGHT WING, DESTROYING

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<sup>264</sup> Air Evaluation Board, 22.

<sup>265</sup> Uchida, "The Zero Mayor" Kurosawa, Takeo," n.p.

<sup>266</sup> Craven and Cate, 319.

<sup>267</sup> Far East Air Forces, "Number of Airborne and Completed Sorties against Balikpapan."; Craven and Cate, vol. 5, 319.

<sup>268</sup> Far East Air Forces, "Number of Airborne and Completed Sorties Against Balikpapan."

<sup>269</sup> 424<sup>th</sup> Bombardment Squadron, "Narrative Combat Report of Mission #307-338," 3 October 1944, in 424<sup>th</sup> Bombardment Squadron History, October 1944, file Sq-Bomb-424-Hi, Oct 1944, Air Force Historical Research Agency, Maxwell Air Force Base, AL.

<sup>270</sup> Air Evaluation Board, 83.

BOTH AIRCRAFT. OVER THE TARGET, HEAVY, INTENSE, AND ACCURATE ANTI-AIRCRAFT FIRE JOINED THE MIX.<sup>271</sup> THIS FIRE DESTROYED TWO B-24S AND DAMAGED FOUR ADDITIONAL BOMBERS SERIOUSLY ENOUGH TO MAKE THEM DROP OUT OF FORMATION, WHERE THEY FELL VICTIM TO THE SWARMING FIGHTERS.<sup>272</sup> COMING OFF TARGET, THE GROUP FORMATION BROKE UP INTO SMALLER ELEMENTS AS SQUADRONS TRIED TO COVER FOR DAMAGED BOMBERS.<sup>273</sup> THE FURIOUS AIR BATTLE CONTINUED AS THE BOMBERS LEFT THE TARGET AREA, WITH THE LAST JAPANESE INTERCEPTORS DISENGAGING FROM THE 307<sup>TH</sup> BOMB GROUP AN HOUR AND FIFTEEN MINUTES AFTER THE INITIAL INTERCEPT.<sup>274</sup>

THE 5<sup>TH</sup> BOMB GROUP, IN THE TRAIL, FORMED THE JAVELIN-DOWN SQUADRON FORMATIONS, BUT THEN, CONTRARY TO THE BRIEF, FLEW THESE FORMATIONS LINE ABREAST AS CLOSELY AS POSSIBLE.<sup>275</sup> ONLY TEN TO FIFTEEN JAPANESE INTERCEPTORS ATTACKED KEN'S MEN, "MAKING UNEAGER HIGH FRONTAL ATTACKS AND PRESSING LOW ATTACKS ON THE B/24'S WITHOUT BALL TURRETS." NEVERTHELESS, TWELVE OF THE GROUP'S BOMBERS WERE DAMAGED BY FIGHTER AND ANTI-AIRCRAFT FIRE.<sup>276</sup> THE 5<sup>TH</sup> BOMB GROUP KEPT GOOD ORDER ON THE BOMB RUN, WITH EIGHTEEN AIRCRAFT BOMBING EDELEANU AND ONE BOMBING PANDASARI.<sup>277</sup>

ALTHOUGH BOMBING IMPROVED OVER THE FIRST RAID, THE RESULTS WERE STILL DISAPPOINTING. POST-RAID RECONNAISSANCE SHOWED ONLY FOUR OF THE 307<sup>TH</sup> BOMB GROUP'S WEAPONS HIT THE EXTREME WEST END OF THE PANDASARI AREA. MOST OF THE BOMBS HIT THE WATER NORTH AND WEST OF THE REFINERY OR IN THE NORTH END OF THE ADJOINING BARRACKS COMPLEX. THE 5<sup>TH</sup> BOMB GROUP'S ACCURACY WAS LITTLE BETTER, WITH ONLY FIVE BOMBS LANDING INSIDE THE DESIGNATED IMPACT AREA. MOST OF THEIR BOMBS FELL TO THE NORTHWEST OF EDELEANU, HITTING THE SOUTHERN END OF THE BARRACKS AREA. FEAF INTELLIGENCE WAS GENEROUS, THEREFORE, TO ASSESS MAJOR DAMAGE TO THE PLANT.<sup>278</sup> REGARDLESS OF THE DAMAGE, LOSSES WERE SEVERE. FEAF LOST SEVEN B-24S WITH TWENTY-FOUR ADDITIONAL AIRCRAFT DAMAGED. MORE CRITICAL THAN THE AIRCRAFT WERE THE SIXTY-FOUR AIRCREW KILLED AND TWENTY-SEVEN WOUNDED. THE UNSUPPORTABLE 19.4% LOSS RATE CONSTITUTED "THE HEAVIEST LOSS FROM A SINGLE OPERATION EVER ANNOUNCED BY THE SOUTHWEST PACIFIC COMMAND."<sup>279</sup>

## CONCLUSION

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<sup>271</sup> 424<sup>th</sup> Bomb Squadron, "Narrative Combat Report of Mission #307-338," 3 October 1944.

<sup>272</sup> Thirteenth Air Force, *Enemy Interception of 13th A.F. Aircraft, 16 Sep 1944-18 Jan 45*, n.p.

<sup>273</sup> 424<sup>th</sup> Bomb Squadron, "Narrative Combat Report of Mission #307-338," 3 October 1944, 5.

<sup>274</sup> Thirteenth Air Force, *Enemy Interception of 13th A.F. Aircraft, 16 Sep 1944-18 Jan 45*, n.p.

<sup>275</sup> Craven and Cate, vol. 5, 319.; Air Evaluation Board, 15.

<sup>276</sup> Thirteenth Air Force, *Enemy Interception of 13th A.F. Aircraft, 16 Sep 1944-18 Jan 45*, n.p.

<sup>277</sup> Craven and Cate, vol. 5, 319.

<sup>278</sup> Air Evaluation Board, 22A, 26.

<sup>279</sup> FIFTH AIR FORCE, *HISTORICAL DATA PERTAINING TO THE FIFTH AIR FORCE MAR-NOV 1944*, FILE 105.2-5C, AIR FORCE HISTORICAL RESEARCH AGENCY, MAXWELL AIR FORCE BASE, AL.

FOR THE 30 SEPTEMBER AND 3 OCTOBER MISSIONS, FEAF DISPATCHED 113 BOMBERS, OF WHICH ONE HUNDRED REACHED BALIKPAPAN. THE JAPANESE DEFENSES DESTROYED THIRTEEN OF THE B-24S AND DAMAGED ANOTHER FORTY. EACH OF THE BOMB GROUPS INVOLVED HAD BEEN MAULED. THE 5<sup>TH</sup> AND 90<sup>TH</sup> BOMB GROUPS RECEIVED A DRUBBING ON 30 SEPTEMBER, AND THE 307<sup>TH</sup> BOMB GROUP TOOK ITS TURN FOUR DAYS LATER.<sup>280</sup> THIS GREAT LOSS RESULTED IN ONLY A SMALL NUMBER OF BOMBS IN THE TARGET AREA. THERE WAS AN OBVIOUS NEED FOR CHANGE.

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<sup>280</sup> Air Evaluation Board, 83.

## CHAPTER 4

### BALIKPAPAN – TACTICAL ANSWERS, STRATEGIC QUESTIONS

*WHIPPING THE NIP ANY TIME AND ANY PLACE, AS INDICATED IN THE BALIKPAPAN ATTACKS, SHOWS AGAIN THE INDOMITABLE COURAGE OF THE 13<sup>TH</sup> AIR FORCE TO WADE IN AGAINST THE JAPS.*

*GENERAL HENRY H. ARNOLD, 8 OCTOBER 1944*

ON 6 OCTOBER 1944, KENNEY SPENT THE DAY AT NOEMFOOR REVIEWING THE CONDITION OF XIII BOMBER COMMAND. IT WAS IMMEDIATELY APPARENT TO KENNEY THAT “MORALE [WAS] NOT TOO GOOD AFTER LOSSES AT BALIKPAPAN.” THEREAFTER, KENNEY “GOT THE KIDS TO LET THEIR HAIR DOWN” AND TALKED TO THEM ABOUT THE IMPORTANCE OF THE TARGET. AFTER LISTENING TO REPORTS FROM THE FIRST TWO MISSIONS, KENNEY DISCUSSED SOME CHANGES IN BOMBER TACTICS. MORE IMPORTANTLY, HE PROMISED NEW RESOURCES IN BOTH BOMBERS AND FIGHTERS. AT THE END OF THE VISIT, KENNEY BELIEVED THAT MORALE WAS “MUCH BETTER AFTER TALKING TO THEM BUT NEITHER GROUP WILL TAKE A BIG LOSS AGAIN SOON WITHOUT CRACKING”<sup>281</sup>

FEAF, THIRTEENTH AIR FORCE, AND FIFTH AIR FORCE COMMANDERS NOW HAD TO FULFILL KENNEY’S PROMISES. IN THIS THEY WERE LARGELY SUCCESSFUL. FEAF RETURNED TO BALIKPAPAN THREE TIMES IN THE NEXT TWO WEEKS, EMPLOYING TACTICS THAT DRASTICALLY REDUCED LOSSES AND PRODUCED EFFECTIVE BOMBING. AT THE END OF THE OPERATION, HOWEVER, QUESTIONS STILL REMAINED AS TO THE STRATEGIC VALUE OF THE RAIDS.

### FOXHOLES IN THE SKY

STREETT’S FIRST PRIORITY WAS TO INCREASE THE EFFECTIVENESS OF HIS BOMBERS. TO DATE, THE LOSSES IN OPERATIONS AGAINST BALIKPAPAN HAD BEEN OUT OF PROPORTION TO THE BOMBING RESULTS. WHILE THERE APPEARED TO BE NO SINGLE ANSWER, FEAF INTRODUCED A NUMBER OF TACTICAL INNOVATIONS THAT COMMANDERS HOPED WOULD HAVE SUBSTANTIAL CUMULATIVE BENEFITS. MOST OF THE INNOVATIONS FOCUSED ON INCREASING BOMBER SURVIVABILITY, AS THIRTEENTH AIR FORCE FELT WELL-DEFENDED FORMATIONS COULD REPRODUCE THE BOMBING ACCURACY THE COMMAND HAD BEEN ACCUSTOMED TO DURING LESS INTENSE OPERATIONS.

THE SIMPLEST METHOD OF INCREASING BOMBER SURVIVABILITY WAS TO SATURATE THE JAPANESE DEFENSES. THE FIRST COMPONENT OF THIS WAS TO INCREASE THE SIZE OF THE ATTACKING FORCE. ON 6 OCTOBER, KENNEY ORDERED FIFTH AIR FORCE TO SUPPORT THE NEXT STRIKE WITH ALL THREE OF ITS FORWARD-BASED B-24 GROUPS. THIS BROUGHT THE UN-BLOODIED 22<sup>ND</sup> AND 43<sup>RD</sup> BOMB GROUPS TO THE OPERATION FOR THE FIRST TIME. STREETT NEEDED THESE BOMB GROUPS NOT ONLY TO

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<sup>281</sup> Kenney Diary, 6 October 1944.



INCREASE THE SIZE OF THE STRIKING FORCE, BUT ALSO TO MAKE UP FOR THE MANY BOMBER LOSSES DURING THE FIRST TWO RAIDS.<sup>282</sup> THE SECOND SATURATION METHOD WAS TO SHORTEN THE STRIKE FORCE'S TIME OVER TARGET. ON THE PREVIOUS RAIDS, THE STRUNG-OUT BOMB GROUPS SPENT AS MUCH AS FORTY-FIVE MINUTES IN THE TARGET AREA. THIS ALLOWED ANTI-AIRCRAFT GUNNERS TO CONCENTRATE ON ONE GROUP AT A TIME, WHILE THE INTERCEPTORS HAD TIME TO LAUNCH, COORDINATE ATTACKS, AND EVEN FLY MULTIPLE SORTIES PER BOMBING RAID.<sup>283</sup> IN RESPONSE TO THIS, STREETT CHANGED THE TARGET AREA TACTICS TO COMPLETE THE ENTIRE RAID IN A TEN-MINUTE WINDOW. IN DO THIS, THIRTEENTH AIR FORCE ASSIGNED DIFFERENT ALTITUDES TO THE PARTICIPATING GROUPS, SENDING HALF OF THE BOMBERS AT APPROXIMATELY 10,000 FEET AND THE OTHER HALF OF THE FORCE AROUND 20,000 FEET. STREET ANTICIPATED THAT THIS WOULD SPLIT THE DEFENSES, AS THE ANTI-AIRCRAFT GUNS WOULD TARGET THE MEDIUM ALTITUDE BOMB GROUPS WHILE THE INTERCEPTORS FOCUSED ON THE BOMBERS AT THE HIGHER ALTITUDES. STREET UNDERSTOOD THAT THIS WOULD NECESSARILY ENTAIL SOME LOSS OF BOMBING ACCURACY FOR THE HIGH ALTITUDE GROUPS.<sup>284</sup>

IN ADDITION TO CHANGING THE CHARACTER OF HOW THE ENTIRE FORCE ARRIVED OVER THE TARGET, FEAF ALSO CHANGED THE EMPLOYMENT OF EACH GROUP FORMATION. THE DISSIMILAR LOSSES BETWEEN THE 5<sup>TH</sup> AND 307<sup>TH</sup> BOMB GROUPS ON 3 OCTOBER INDICATED THAT DEFENSIVE BOMBER FORMATIONS MIGHT PROVIDE A PARTIAL ANSWER TO THE JAPANESE FIGHTER PROBLEM. IN LIEU OF THE JAVELIN-DOWN FORMATION, THEREFORE, STREET INTRODUCED THE COMBAT BOX FORMATION DEVELOPED IN EUROPE. ON 5-7 OCTOBER, STREET HAD EACH THIRTEENTH AIR FORCE BOMB GROUP FLY TWO TRAINING MISSIONS AGAINST LARGE NUMBERS OF P-47S. ONE SQUADRON HISTORY SUMMED UP THE EXPERIMENT, RECORDING "THE NEW FORMATION, WHILE SLIGHTLY MORE DIFFICULT TO FLY, PROVED SUCCESSFUL AND HAS SINCE BEEN ADAPTED BY THIS SQUADRON AND BY THE GROUP."<sup>285</sup> UNFORTUNATELY, FIFTH AIR FORCE GROUPS DID NOT PARTICIPATE IN THESE TRAINING MISSIONS, AND THEY CONTINUED TO EMPLOY THE JAVELIN-DOWN FORMATION IN THE NEXT TWO RAIDS.<sup>286</sup>

WHILE THE BOMB GROUPS REFINED THEIR TACTICS, FEAF TOOK MEASURES TO ENSURE THAT THE JAPANESE DEFENSES WERE TOO PREOCCUPIED TO IMPROVE THEIRS. TO DO THIS, FEAF TASKED THE RADAR-EQUIPPED 868<sup>TH</sup> BOMB SQUADRON FROM THIRTEENTH AIR FORCE AND THE 63<sup>RD</sup> BOMB SQUADRON FROM FIFTH AIR FORCE TO "HARASS THE BALIKPAPAN DEFENSES AND KEEP THE JAPANESE PILOTS AWAKE AT NIGHT."<sup>287</sup> THESE RAIDS STARTED ON THE NIGHT OF 6 OCTOBER AND LASTED UNTIL 20 OCTOBER. FEAF DISPATCHED THIRTY-SIX NIGHT RAIDERS, OF WHICH TWENTY-NINE ATTACKED THE TARGET. THE SNOOPERS USUALLY RAIDED BALIKPAPAN BETWEEN 21:00 AND 2:00, BOMBING BY RADAR FROM APPROXIMATELY 9,000 FEET. IN TOTAL, THE SNOOPERS DROPPED 29.4 TONS OF BOMBS ON

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<sup>282</sup> Craven and Cate, vol. 5, 319; Kenney Diary, 6 October 1944.

<sup>283</sup> Thirteenth Air Force, *Enemy Interception of 13th A.F. Aircraft, 16 Sep 1944-18 Jan 45*, n.p.; History, 424<sup>th</sup> BS, "Narrative Combat Report of Mission #307-338, 3 October 1944, 2.

<sup>284</sup> Craven and Cate, vol. 5, 319; Air Evaluation Board, 15.

<sup>285</sup> Kenney Diary, 6 October 1944; Craven and Cate, vol. 5, 319; 424<sup>th</sup> BS History, October 1944, 2, 9.

<sup>286</sup> Air Evaluation Board, 15.

<sup>287</sup> Craven and Cate, vol. 5, 320.

BALIKPAPAN, THE MAJORITY OF WHICH WERE FRAGMENTATION BOMBS ON FIGHTER AIRDROMES.<sup>288</sup> SOME AIRCRAFT APPROACHED THE TARGET AT LOW ALTITUDE, STRAFING WITH .50 CALIBER GUNS AS WELL AS BOMBING. ONE SNOOPER CREW CLAIMED TO HAVE SET FIVE OIL TANKS AFIRE WITH THEIR GUNS.<sup>289</sup> THESE RAIDS DEMONSTRATED THE WEAKNESS OF THE JAPANESE NIGHT DEFENSES, AS THE ANTI-AIRCRAFT FIRE WAS GENERALLY INACCURATE AND THE S902 HIKOTAI NIGHT FIGHTERS NEVER MADE A SUCCESSFUL INTERCEPT.<sup>290</sup>

FEAF USED THE 868<sup>TH</sup> BOMBARDMENT SQUADRON FOR ANOTHER TACTICAL IMPROVEMENT, DISPENSING CHAFF. FEAF HOPED THAT AN AIRCRAFT DISPENSING WINDOW IN THE AREA WOULD CONFUSE THE JAPANESE DEFENDERS AND PERHAPS GENERATE AN EARLY, FUEL-CONSUMING LAUNCH BY THE INTERCEPTORS. SO, FEAF DIRECTED THE 868<sup>TH</sup> TO SEND ONE AIRCRAFT TO DROP 1000 LBS OF WINDOW ON A COURSE LEADING TO WITHIN SIXTY MILES OF BALIKPAPAN AN HOUR PRIOR TO THE ARRIVAL OF THE RAID. CHAFF WOULD ONLY BE EFFECTIVE, OF COURSE, IF FEAF FOUND SOME METHOD OF KEEPING THE JAPANESE SPOTTER AIRCRAFT AT BAY.<sup>291</sup>

FINALLY, FEAF RE-EXAMINED THE BOMBERS' ORDNANCE LOADS IN LIGHT OF THE DISAPPOINTING LEVELS OF DAMAGE FROM THE FIRST TWO RAIDS. THE DAY AFTER THE FIRST RAID, STREETT ASKED THE THIRTEENTH AIR FORCE OPERATIONS ANALYSIS SECTION FOR BOMB RECOMMENDATIONS. IN A 5 OCTOBER RESPONSE, THE ANALYSIS SECTION REITERATED EARLIER BELIEFS THAT THE 250 LB. HIGH EXPLOSIVE BOMB PROVIDED THE BEST COMPROMISE BETWEEN AREA COVERAGE, BLAST DAMAGE, AND INCENDIARY EFFECTS. THE ANALYSIS SECTION BASED IT FINDINGS LARGELY ON THE EXAMINATION OF ITALIAN OIL REFINERIES BOMBED BY FIFTEENTH AIR FORCE.<sup>292</sup> IN SPITE OF THIS RECOMMENDATION, ALL THE BOMB GROUPS SWITCHED TO HEAVIER ORDNANCE. THE THIRTEENTH AIR FORCE'S 5<sup>TH</sup> AND 307<sup>TH</sup> BOMB GROUPS LARGELY CHANGED FROM 250 LB. HIGH EXPLOSIVE BOMBS, WHICH CONSTITUTED 80% OF THE TONNAGE DROPPED IN THE FIRST TWO RAIDS, TO 500 LB. HIGH EXPLOSIVE BOMBS, WHICH CONSTITUTED APPROXIMATELY 69% OF THE TONNAGE DROPPED THROUGH THE REST OF THE OPERATION. FIFTH AIR FORCE TOOK THE INCREASE IN BOMB WEIGHT A STEP FURTHER, DROPPING 1,000 LB. DEMOLITION BOMBS ON THE 14 OCTOBER MISSION. IN ADDITION TO THE INCREASE IN WEIGHT, THIRTEENTH AIR FORCE ADDED A SMALL NUMBER OF 500 LB. INCENDIARIES TO THE BOMB LOADS FOR THE UPCOMING STRIKE.<sup>293</sup>

OVERALL, THEN, THE BOMBER CREWS USED THE WEEK-LONG HIATUS TO REVAMP THEIR APPROACH TO BALIKPAPAN. IT WAS CLEAR THAT PLANNERS HAD ORIGINALLY UNDERESTIMATED THE

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<sup>288</sup> THIRTEENTH AIR FORCE, "DISPOSITION OF ALL BOMBS CARRIED ON BALIKPAPAN STRIKES FROM 28 SEPTEMBER TO 18 OCTOBER 1944," CHART, FILE 732.308-5, AIR FORCE HISTORICAL RESEARCH AGENCY, MAXWELL AIR FORCE BASE, AL.

<sup>289</sup> Air Evaluation Board, 19.

<sup>290</sup> Thirteenth Air Force, *Attacks against Strategic Enemy Oil Centers*.

<sup>291</sup> Craven and Cate, vol. 5, 320.

<sup>292</sup> Air Advisory Board, 45-48.

<sup>293</sup> Far East Air Forces, "Type, Size, and Weight of Bombs Dropped on Balikpapan Installations," chart, file 732.308-5, Air Force Historical Research Agency, Maxwell Air Force Base, AL.

MAGNITUDE OF THE TASK. NOW, THE XIII AND V BOMBER COMMANDS WERE READY TO GAIN THE UPPER HAND.

## LITTLE FRIENDS

THE MOST SIGNIFICANT TACTICAL IMPROVEMENT FEAF MADE BETWEEN 3 AND 10 OCTOBER HAD NOTHING TO DO WITH BOMBERS AT ALL. FEAF LEADERS MADE MONUMENTAL EFFORTS TO BRING FIGHTERS INTO THE BALIKPAPAN OPERATION. THE ELEMENTS FOR VERY LONG-RANGE FIGHTER ESCORT HAD BEEN BREWING FOR SEVERAL MONTHS. FEAF QUICKLY PUT THE INGREDIENTS TOGETHER IN THE FIRST WEEK OF OCTOBER. THIS EFFORT LED TO SOME OF THE MOST COMPLICATED AND DEMANDING FIGHTER MISSIONS OF WORLD WAR II.

THE PILOTS OF THE V AND XIII FIGHTER COMMANDS WERE VERY AWARE OF THE BOMBERS' PLIGHT. THEY WATCHED AS BATTLE DAMAGED B-24S MADE EMERGENCY LANDINGS OR CRASHED ON THEIR SHORT FIGHTER AIRSTRIPS AFTER THE FIRST TWO BALIKPAPAN RAIDS. THE FIGHTER UNITS FELT A SENSE OF ATTACHMENT TO THESE BOMBER GROUPS THAT THEY HAD ESCORTED OVER JAPANESE TARGETS THROUGHOUT THE NEW GUINEA AND SOLOMONS CAMPAIGNS. AS SUCH, KENNEY RECEIVED A STARTLING PROPOSAL WHEN HE VISITED NOEMFOOR ON 6 OCTOBER. STREET BRIEFED KENNEY ON A REQUEST BY P-47 PILOTS FROM THE 35<sup>TH</sup> FIGHTER GROUP. FIFTY OF THESE PILOTS VOLUNTEERED TO FLY ESCORT FOR THE B-24S ON THE NEXT RAID, EVEN THOUGH THEIR NORMAL COMBAT CONFIGURATION DID NOT PROVIDE ENOUGH FUEL TO RETURN. THE PILOTS PROPOSED TO BAIL OUT OVER THE MOLUCCA SEA ONCE THEIR TANKS RAN DRY, AS LONG AS FEAF ASSIGNED THE SEARCH AND RESCUE CATALINA FLYING BOATS TO PICK THEM UP.<sup>294</sup> FORTUNATELY, FEAF OBIATED THE NEED FOR SUCH EXTREME MEASURES BY COMBINING ENGINEERING, OPERATIONAL, AND BASING INNOVATIONS.

CHARLES LINDBERG MADE THE FIRST CONTRIBUTION TOWARD SOLVING FEAF'S FIGHTER RANGE PROBLEM. THE LONE EAGLE HAD TRAVELED TO THE SOUTH PACIFIC TO STUDY THE RANGE AND PAYLOAD PERFORMANCE OF CONTEMPORARY FIGHTERS, SPECIFICALLY THE F4U CORSAIR AND THE P-38 LIGHTNING. FOR HIS P-38 INVESTIGATIONS, LINDBERG JOINED WITH COL. THOMAS MCGUIRE'S 475<sup>TH</sup> FIGHTER GROUP, WHICH WAS OPERATING THE P-38J AND P-38L. THESE LATER VERSIONS OF THE TWIN-BOOMED FIGHTER WERE EQUIPPED WITH A WET WING THAT PROVIDED 110 GALLONS OF ADDITIONAL FUEL.<sup>295</sup> ALTHOUGH OFFICIALLY AN OBSERVER, LINDBERG FLEW AIR-TO-GROUND AND AIR-TO-AIR COMBAT OPERATIONS WITH THE GROUP, INSTRUCTING THE PILOTS ON HOW TO INCREASE RANGE BY REDUCING REVOLUTIONS PER MINUTE (RPMs), LEANING THE FUEL MIXTURE, AND INCREASING MANIFOLD PRESSURE. THE P-38 PILOTS WERE SKEPTICAL AT FIRST, BUT SOON FOUND THAT THE PROCEDURES PRODUCED AN EXTRA TWO HUNDRED MILES OF COMBAT RADIUS AND TWO HOURS OF MISSION ALOFT TIME. THE INCREASED AREA OF OPERATION AND OPPORTUNITIES FOR TACTICAL SURPRISE WERE WELL

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<sup>294</sup> Kenney Diary, 6 October 1944.

<sup>295</sup> BAUGHER, JOE, "LOCKHEED P-38 LIGHTNING," N.P., ON-LINE, INTERNET, 26 APRIL 2005, AVAILABLE FROM [HTTP://HOME.ATT.NET/~JBAUGHER1/P38.HTML](http://home.att.net/~jbaugher1/p38.html).

WORTH THE INCREASED WEAR ON THE ENGINES. USING LINDBERG'S TECHNIQUES, THE 475<sup>TH</sup> FIGHTER GROUP BEGAN FLYING AS FAR AS SEVEN HUNDRED NAUTICAL MILES FROM THEIR BASES.<sup>296</sup>

THIS, HOWEVER, WAS STILL NOT ENOUGH; THE STRAIGHT-LINE DISTANCE FROM THE ALLIES CLOSEST FORWARD STRIP, MOROTAI, WAS 720 NAUTICAL MILES.<sup>297</sup> THE ANSWER CAME FROM FAR EAST SERVICE COMMAND. DIRECTED TO EXTEND THE RANGE OF FIGHTERS EVEN FARTHER, THEY PROPOSED EQUIPPING THE P-38S WITH A NOVEL DROP TANK CONFIGURATION. RATHER THAN FLY WITH THE STANDARD LOAD OF TWO 165-GALLON TANKS, THE P-38S CARRIED ONE 165-GALLON TANK AND ONE 310-GALLON FERRY TANK. WHILE TWO 610-GALLON TANKS WOULD HAVE UNACCEPTABLY OVERLOADED THE AIRCRAFT, THE ASYMMETRICAL TANK CONFIGURATION PROVIDED ACCEPTABLE FLIGHT CHARACTERISTICS AND THE NECESSARY RANGE. THE P-38 PILOTS DRAINED THE 610-GALLON TANK FIRST, THEN DROPPED IT TO INCREASE SPEED AND FUEL EFFICIENCY. THE P-38S COULD RETAIN THE SMALL 165-GALLON TANK DURING COMBAT OPERATIONS OR COULD DROP IT IF THEY NEEDED TO MANEUVER AGGRESSIVELY.<sup>298</sup>

FEAF APPLIED SIMILAR CONCEPTS TO ITS P-47S. LUCKILY, THE AAF HAD RECENTLY EQUIPPED THE 35<sup>TH</sup> FIGHTER GROUP WITH NEW P-47D-28 AIRCRAFT. THE DESIGN OF THESE BUBBLE-CANOPY P-47S INCREASED INTERNAL FUEL CAPACITY FROM 305 TO 370 GALLONS.<sup>299</sup> TO THIS INTERNAL FUEL, THE 35<sup>TH</sup> ADDED ONE 165-GALLON EXTERNAL DROP TANK TO EACH WING AND A 75-GALLON TANK TO THE BELLY. EVEN THOUGH HE WAS NOT QUALIFIED IN THE P-47, LINDBERG VISITED THE 35<sup>TH</sup> FIGHTER GROUP AT NADZAB, NEW GUINEA, GIVING THE PILOTS A "HIGHLY TECHNICAL" TALK ON HOW TO EXTEND THEIR RANGE.<sup>300</sup> ALTHOUGH THE P-47 DID NOT OFFER THE SAME LOITER TIME AS THE P-38, THE THUNDERBOLTS COULD STILL FLY TO BALIKPAPAN, SPEND TWENTY-FIVE MINUTES OVER THE TARGET, AND RETURN. THIS FLIGHT PROFILE ENABLED THE 35<sup>TH</sup> FIGHTER GROUP TO ACCOMPLISH PRE-STRIKE FIGHTER SWEEPS OVER BORNEO.<sup>301</sup>

EVEN WITH ALL OF THE TECHNICAL AND OPERATIONAL IMPROVEMENTS, THE FIGHTERS COULD ONLY REACH BALIKPAPAN BY TAKING OFF FROM MOROTAI. MACARTHUR'S TROOPS CAPTURED THE ISLAND, AT THE NORTH END OF THE HALMAHERA CHAIN, ONLY TWO WEEKS PRIOR TO THE BALIKPAPAN RAIDS. IN KEEPING WITH THEIR PATTERN, FEAF ENGINEERS IMMEDIATELY SET ABOUT THE TASK OF PREPARING AIRFIELDS. THE ENGINEERS IMPROVED TWO AIRFIELDS WELL ENOUGH FOR THE 8<sup>TH</sup> FIGHTER GROUP P-38S TO MOVE IN 19 SEPTEMBER, WITH THE 35<sup>TH</sup> FIGHTER GROUP P-47S FOLLOWING EIGHT

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<sup>296</sup> BERG, A. SCOTT, *LINDBERG* (NEW YORK: G. P. PUTNAM'S SONS, 1988), 450-454.

<sup>297</sup> LIEUTENANT GENERAL GEORGE C. KENNEY, USA, COMMANDER FAR EAST AIR FORCES, TO GENERAL H. H. ARNOLD, COMMANDING GENERAL ARMY AIR FORCES, MESSAGE NO. A-79210, 15 OCTOBER 1944, GENERAL GEORGE C. KENNEY PAPERS, VOLUME IX, AIR FORCE HISTORY SUPPORT OFFICE, BOLLING AIR FORCE BASE, WASHINGTON, D.C.

<sup>298</sup> Air Advisory Board, 59-62.

<sup>299</sup> JOE BAUGHER, "REPUBLIC P-47D THUNDERBOLT," N.P., ON-LINE, INTERNET, 26 APRIL 2005, AVAILABLE FROM [HTTP://HOME.ATT.NET/~JBAUGHER1/P47\\_4.HTML](http://home.att.net/~jbaugher1/p47_4.html).

<sup>300</sup> RICHARD DEBAUGH, "RICHARD DEBAUGH, 41<sup>ST</sup> FIGHTER SQUADRON, 35<sup>TH</sup> FIGHTER GROUP," IN "MISSING AIR CREW: THE SEARCH FOR THE COLEMAN B-24 CREW," N.P., ON-LINE, INTERNET, 26 APRIL 2005, AVAILABLE FROM [HTTP://WWW.MISSINGAIRCREW.COM/307/RD.ASP](http://www.missingaircrew.com/307/rd.asp).

<sup>301</sup> Kenney to Arnold, 15 October 1944.

DAYS LATER. THE FIFTH AIR FORCE'S OTHER TWO P-38 GROUPS, THE 49<sup>TH</sup> AND 475<sup>TH</sup>, STATIONED ON BIAK, STAGED THROUGH MOROTAI FOR THE RAIDS. AS THE P-38 CREWS GAINED CONFIDENCE IN THE ASYMMETRIC TANK CONFIGURATION, THEY WERE WILLING TO OPERATE FROM EVEN LONGER DISTANCES. FOR THE LAST TWO RAIDS, XIII FIGHTER COMMAND LAUNCHED ITS ESCORT MISSIONS FROM THE AIRSTRIPS AT SANSAPOR AND MIDDLEBERG, NEW GUINEA.

THE BALIKPAPAN MISSIONS REQUIRED THE FIGHTER PILOTS TO FLY AS LONG AS NINE-AND-A-HALF HOURS IN CRAMPED AND UNCOMFORTABLE COCKPITS. IN ORDER TO HELP WITH THIS, FEAF LIFE SUPPORT PERSONNEL REDESIGNED THE SEAT-TYPE PARACHUTE, LIFE RAFT, AND JUNGLE SURVIVAL KIT TO MAKE IT MORE COMFORTABLE. ALSO, MOST PILOTS OPTED TO FLY WITH A FOAM-RUBBER SEAT CUSHION. FLIGHT SURGEONS PRESCRIBED A STRICT DIET FOR PRE-MISSION MEALS AND IN THE IN-FLIGHT LUNCHES. THE FLIGHT SURGEONS ALSO PROVIDED BENZEDRINE SULFATE TABLETS TO HELP COUNTERACT PILOT FATIGUE BEFORE LANDING. NEARLY HALF OF THE PILOTS, HOWEVER, ELECTED TO TAKE THIS STIMULANT HALF HOUR BEFORE REACHING THE TARGET. ON THE OTHER END OF THE PHARMACEUTICAL SPECTRUM, SOME PILOTS USED MORPHINE SYRETTES TO RELIEVE ABDOMINAL CRAMPS AND TORSO PAIN. AT THE END OF THE MISSION, MANY PILOTS WERE SO EXHAUSTED AND CRAMPED THAT GROUND CREWS HAD TO LIFT THEM FROM THE COCKPITS. NEVERTHELESS, FEAF MEDICAL PERSONNEL FELT THE PILOTS COULD REGULARLY CONDUCT THESE MISSIONS, AS LONG AS THEY DID NOT HAVE TO FLY ON SUCCESSIVE DAYS.<sup>302</sup>

#### 10 OCTOBER 1944 – THE TEST OF BATTLE

FEAF SET TO THE TASK OF PLANNING THE NEXT MISSION USING ALL THE NEW TACTICAL TOOLS DEVELOPED DURING THE PRECEDING WEEK. ACCORDING TO THE FIELD ORDER, THE 35<sup>TH</sup> FIGHTER GROUP'S 40<sup>TH</sup> AND 41<sup>ST</sup> FIGHTER SQUADRONS WERE TO BE THE FIRST AIRCRAFT OVER BALIKPAPAN, SWEEPING THE TARGET AREA FOR ENEMY FIGHTERS SHORTLY BEFORE THE MAIN FORMATION ARRIVED. THE PLAN THEN CALLED FOR THE FIVE B-24 GROUPS TO ATTACK BALIKPAPAN'S MAJOR FACILITIES IN QUICK SUCCESSION. THE TWO THIRTEENTH AIR FORCE BOMB GROUPS, THE 5<sup>TH</sup> AND 307<sup>TH</sup>, WERE TO LEAD WITH AN ATTACK FROM HIGH ALTITUDE. SINCE THESE GROUPS WOULD BE LEAST ACCURATE, THIRTEENTH AIR FORCE ASSIGNED THEM THE RAID'S LESS CRITICAL AIM POINTS, CONSISTING OF THE PARAFFIN WAX AND LUBRICATING REFINERY AND THE CRACKING PLANTS. THE V BOMBER COMMAND GROUPS WERE TO FOLLOW IN CLOSE TRAIL AT MEDIUM ALTITUDE.<sup>303</sup> THIRTEENTH AIR FORCE DIRECTED THESE GROUPS AGAINST THE MOST CRITICAL TARGETS, WITH THE 90<sup>TH</sup> BOMB GROUP STRIKING EDELEANU, THE 22<sup>ND</sup> BOMB GROUP STRIKING PANDASARI, AND THE UNDER-STRENGTH 43D BOMB GROUP ALSO STRIKING THE PARAFFIN WAX AND LUBRICATING OIL REFINERY.<sup>304</sup> THE BOMBERS WERE TO

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<sup>302</sup> Air Advisory Board, 20-21, 59-60, 63-66.

<sup>303</sup> Craven and Cate, vol. 5, 320.

<sup>304</sup> V Bomber Command, *Heavy Bomber Strikes of Sept. 30, Oct. 10, and Oct. 14, 1944 on Padansari Refinery, Edeleanu (Bendex) Plant, and Paraffin & Lubricating Oil Refinery at Balikpapan, Borneo*, n.p.

HAVE A CLOSE ESCORT OF P-38S FROM THE 49<sup>TH</sup> FIGHTER GROUP'S 9<sup>TH</sup> FIGHTER SQUADRON, WHICH WAS TO JOIN THE BOMBER FORMATION JUST PRIOR TO THE ATTACK RUN.<sup>305</sup>

PREPARATION FOR THE MISSION BEGAN ON THE NIGHT OF 6 OCTOBER, WHEN SNOOPERS FROM THE 868<sup>TH</sup> AND 63<sup>RD</sup> BOMB SQUADRONS HARASSED THE JAPANESE DEFENSES. THE SQUADRONS REPEATED THESE RAIDS ON 7 OCTOBER AND THEN AGAIN IMMEDIATELY PRIOR TO THE 10 OCTOBER MISSION.<sup>306</sup> ON 9 OCTOBER, THE 49<sup>TH</sup> FIGHTER GROUP STAGED FIFTEEN P-38S FROM BIAK TO MOROTAI. FOR THIS MISSION, THE 49<sup>TH</sup> SELECTED THE MOST SENIOR FIGHTER PILOTS FROM GROUP HEADQUARTERS AND THE 9<sup>TH</sup> SQUADRON. THE FLIGHT LEADERS WERE MAJOR WALLY JORDAN AND AMERICA'S LEADING ACE, MAJOR RICHARD BONG. THIS WAS IN SPITE OF THE FACT THAT BONG WAS OSTENSIBLY RETIRED FROM COMBAT, AND HE WAS BACK IN THE PACIFIC ONLY TO INSTRUCT V FIGHTER COMMAND PILOTS IN GUNNERY SKILLS.<sup>307</sup> THE FIFTH AIR FORCE BOMBERS, IN CONTRAST, DID NOT DEPLOY FORWARD FOR THIS RAID. GIVEN THE NUMBER OF BOMBERS INVOLVED IN THE 10 OCTOBER MISSION, IT WOULD HAVE BEEN IMPRACTICAL TO HAVE LAUNCHED OUT OF ONE AIRFIELD. THEREFORE, THE FIFTH AIR FORCE GROUPS PREPARED THEIR AIRCRAFT AND LAUNCHED FROM THEIR MORE DISTANT BASES AT BIAK AND OWI.<sup>308</sup>

EARLY ON THE MORNING OF 10 OCTOBER, 124 BOMBERS LAUNCHED FROM THEIR BASES AT NOEMFOOR, BIAK, AND OWI WITHOUT INCIDENT.<sup>309</sup> THE FIGHTERS, BASED CLOSER TO BORNEO AND FLYING AT FASTER CRUISE SPEEDS, TOOK OFF SEVERAL HOURS LATER TO MEET THEIR ASSIGNED TARGET TIMES.<sup>310</sup> UNFORTUNATELY, THE FIGHTER LAUNCH WAS NOT PERFECT, AS ONE OF THE HEAVILY-LADEN P-47S CRASHED ON TAKE-OFF, INJURING THE PILOT. THE BOMBERS AND FIGHTERS FLEW CONVERGING COURSES TO BALIKPAPAN, WITH A PLANNED RENDEZVOUS POINT JUST OFF THE BORNEO COAST. THE FIGHTERS WERE NOT ABLE TO CONDUCT A CLOSE ESCORT ALL THE WAY TO THE TARGET, AS THE FOUR HOURS OF OXYGEN THEY CARRIED DICTATED THAT THEY FLY MOST OF THE ROUTE UNDER 10,000 FEET. POOR WEATHER HAMPERED THE BOMBERS EN-ROUTE, AND ONLY 104 BOMBERS WERE TO MAKE IT OVER THE TARGETS. ONE OF THE B-24S CRASHED PRIOR TO THE RENDEZVOUS POINT FOR UNKNOWN CAUSES.<sup>311</sup> BETWEEN 08:32 AND 09:00, AS THE FORMATIONS WINGED TOWARD BORNEO, ONE B-24 FROM THE 868<sup>TH</sup> BOMB SQUADRON DROPPED 1,000 LBS. OF CHAFF ON A COURSE LEADING TO WITHIN SIXTY MILES OF BALIKPAPAN. THIS DECEPTION EFFORT WAS UNSUCCESSFUL, AS THE ALL-TOO-FAMILIAR N1J1 NIGHT FIGHTERS JOINED WITH THE BOMBER FORMATION OVER THE CELEBES.<sup>312</sup> THESE AIRCRAFT

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<sup>305</sup> Craven and Cate, vol. 5, 320.

<sup>306</sup> Thirteenth Air Force, *Attacks against Strategic Enemy Oil Centers*, n.p.

<sup>307</sup> S.W. FERGUSON and WILLIAM K. PASCALIS. *PROTECT AND AVENGE: THE 49<sup>TH</sup> FIGHTER GROUP IN WORLD WAR II*. (ATGLEN, PA: SCHIFFER MILITARY/AVIATION HISTORY, 1996), 269.

<sup>308</sup> Air Advisory Board, 15.

<sup>309</sup> Thirteenth Air Force, "Number of Airborne and Completed Sorties against Balikpapan."

<sup>310</sup> Ferguson and Pascalis, 269.

<sup>311</sup> Air Advisory Board, 21, 68-69, 83.

<sup>312</sup> Craven and Cate, vol. 5, 320.

AND FLOAT PLANES FROM BALIKPAPAN PROVIDED ACCURATE TARGETING INFORMATION ON THE INCOMING RAID.<sup>313</sup>

THE FIGHTER SWEEP UNFOLDED AS PLANNED WHEN FIFTEEN P-47S ARRIVED OVER BALIKPAPAN AT 20,000 FEET. THEY MET RESISTANCE IMMEDIATELY, ENGAGING TWENTY-FIVE TO THIRTY-FIVE JAPANESE INTERCEPTORS. THE 35<sup>TH</sup> FIGHTER GROUP PILOTS CLAIMED SIX KILLS TO THE LOSS OF ONE P-47, DEPARTING THE AREA AT 10:45. UNFORTUNATELY, THE MAIN ATTACK WAS NOT DEVELOPING AS WELL. THE CAREFULLY PLANNED BOMBING SCHEME UNRAVELED WHEN THE XIII BOMBER COMMAND AND V BOMBER COMMAND GROUPS COULD NOT LINK UP. THE FIFTH AIR FORCE GROUPS ARRIVED AT THE RENDEZVOUS FIRST AND WAITED UNTIL THEIR FUEL DREW SHORT. WITH THE THIRTEENTH AIR FORCE FORMATION STILL NOT IN SIGHT, THESE THREE GROUPS PROCEEDED TO THE TARGET, TAKING THE BRUNT OF THOSE JAPANESE FIGHTERS THAT HAD AVOIDED THE P-47S. WORKING AROUND WEATHER, THE 90<sup>TH</sup> GROUP DIVIDED ITS BOMBS BETWEEN PANDASARI AND EDELEANU WHILE DEFENDING AGAINST TWENTY-FIVE TO THIRTY JAPANESE INTERCEPTORS. THIS GROUP LOST ONE AIRCRAFT TO A PHOSPHORUS AIR-TO-AIR BOMB. STRONG FIGHTER ATTACKS DESTROYED THREE B-24S AND DISRUPTED THE ACCURACY OF THE 22<sup>ND</sup> GROUP AS IT BOMBED THE PANDASARI REFINERY. WITH THE DEFENSES SOMEWHAT EXPENDED, THE NINETEEN B-24S OF THE 43D GROUP BOMBED THE PARAFFIN REFINERY AND STORAGE AREA WITHOUT LOSS.<sup>314</sup>

THE P-38S JOINED WITH THE THIRTEENTH AIR FORCE BOMBER GROUPS JUST OFF THE EAST COAST OF BORNEO, UNAWARE THAT THEY HAD MISSED THE FIRST HALF OF THE STRIKE PACKAGE. ESCORTING THE BOMBERS INTO THE AREA, THE P-38S QUICKLY SIGHTED JAPANESE FIGHTERS. BONG DREW FIRST BLOOD, DESTROYING A *GEKKO* NIGHT FIGHTER FROM S902 *HIKOTAI*.<sup>315</sup> WITH THE BATTLE JOINED, THE 49<sup>TH</sup> FIGHTER GROUP LEFT ONE FLIGHT AS HIGH COVER WHILE THE REST OF THE FIGHTERS ENGAGED JAPANESE SINGLE-ENGINE AIRCRAFT OVER MANGGAR.<sup>316</sup> THE DOGFIGHTS, INCLUDING ONE IN WHICH BONG CLAIMED HIS THIRTIETH VICTIM, WERE CLEARLY VISIBLE TO THE BOMBER CREWS AS THEY SET UP FOR THEIR BOMB RUNS.<sup>317</sup> WITH THE P-38S OCCUPYING THE JAPANESE FIGHTERS, BOTH THE 5<sup>TH</sup> AND 307<sup>TH</sup> BOMB GROUPS ATTACKED THEIR TARGETS ACCURATELY WHILE SUFFERING NO LOSSES.<sup>318</sup> THE FEW JAPANESE PILOTS THAT DID ENGAGE THE BOMBERS MADE FRONTAL ATTACKS BUT "DID NOT APPEAR VERY AMBITIOUS."<sup>319</sup>

ANALYSIS OF THE POST STRIKE PHOTOS SHOWED THAT THIS WAS THE FIRST RAID IN WHICH FEAF ACHIEVED GOOD BOMBING RESULTS. THE BOMB PLOTS SHOWED THAT A HEAVY GROUP OF BOMBS HIT EACH OF THE ASSIGNED TARGET AREAS. ADDITIONALLY, THE BOMBER CREWS REPORTED FIRES

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<sup>313</sup> Air Advisory Board, 16.

<sup>314</sup> Craven and Cate, vol. 5, 320; Far East Air Forces, "Number of Airborne and Completed Sorties against Balikpapan;" Air Evaluation Board, 69.

<sup>315</sup> Uchida, n.p.

<sup>316</sup> Ferguson and Pascalis, 270.

<sup>317</sup> History, 424<sup>th</sup> Bomb Squadron, Narrative Combat Report of Mission #307-341, 10 October 1944, 1-2.

<sup>318</sup> Craven and Cate, vol. 5, 320.

<sup>319</sup> History, 424<sup>th</sup> Bomb Squadron, Narrative Combat Report of Mission #307-341, 10 October 1944, 1-2.

THROUGHOUT THE REFINERY. AT PANDASARI, THE BOMBERS DESTROYED THREE LARGE AND TEN SMALL STORAGE TANKS, ELEVEN MAJOR AND SIXTEEN SMALLER BUILDINGS, THE BOILER HOUSE FRACTIONING COLUMNS, THE CHEMICAL WATER TREATING PLANTS, AND PORTIONS OF THE PIPELINE. AT EDELEANU, THE PHOTOS SHOWED DAMAGE TO THE SULFUR DIOXIDE PLANT, THE WATER PUMP HOUSE, AND KEROSENE TANKS. AT THE PARAFFIN AND LUBRICATING OIL REFINERY, THE BOMBERS DESTROYED THE POWERHOUSE AND NUMEROUS SMALL BUILDINGS WHILE PARTLY DESTROYING THE PUMP HOUSE, BOILER HOUSE, AND TWELVE ASSOCIATED BUILDINGS. THE CRACKING PLANT SHOWED THE LEAST DAMAGE OF THE FACILITIES, WITH ONLY TWO STORAGE TANKS DESTROYED. SCATTERED BOMBS CAUSED ADDITIONAL DAMAGE THROUGHOUT THE FACILITY, WITH A PARTICULARLY HEAVY GROUPING HITTING THE FLOAT PLANE BASE.<sup>320</sup> V Bomber Command analysts optimistically assessed that Balikpapan was out of action for several months. FEAF, however, was not as confident.<sup>321</sup>

THE LOSS RATES ON THIS RAID ALSO SHOWED DRAMATIC IMPROVEMENT, BUT WERE STILL TOO HIGH FOR COMFORT. OVERALL, FEAF LOST FOUR B-24s, THREE FROM THE 22<sup>ND</sup> BOMB GROUP AND ONE FROM THE 90<sup>TH</sup> BOMB GROUP. THIS WAS THE SMALLEST LOSS OF BOMBERS TO DATE, DESPITE THE FACT THAT THERE WERE MORE ATTACKERS AND DEFENDERS IN THE SKY. ON THE DOWN SIDE, A TOTAL OF FORTY-TWO BOMBERS WERE DAMAGED BY AERIAL OR ANTI-AIRCRAFT FIRE, ALTHOUGH MOST OF THIS DAMAGE WAS MINOR. FINALLY, V FIGHTER COMMAND LOST ONE P-47 IN COMBAT. IN RETURN, THE AMERICAN AIRMEN CLAIMED TO HAVE DESTROYED FIFTY-SEVEN JAPANESE AIRCRAFT, ALTHOUGH LEADERS THOUGHT THESE FIGURES WERE PROBABLY EXAGGERATED.<sup>322</sup> THEREFORE, THE THIRD RAID OF THE BALIKPAPAN SERIES SHOWED THAT FEAF WAS ON THE PROPER TACTICAL PATH. BUT, THE LEADERS AND CREWS WERE WELL AWARE THAT PLANNING AND EXECUTION ERRORS WERE FAR TOO PREVALENT, RESULTING IN INACCURATE BOMBING AND LOSS OF LIFE. FEAF REDOUBLED EFFORTS TO CORRECT THESE PROBLEMS ON THE NEXT VISIT.

#### 14 OCTOBER 1944 – THE TACTICAL PAY-OFF

RESUMING THE ORIGINAL OPERATIONAL SCHEDULE, FEAF PLANNED TO RETURN TO BALIKPAPAN FOUR DAYS LATER. IN THE PLANNING STAGES, FEAF ATTEMPTED TO FINE-TUNE WHAT APPEARED TO HAVE BEEN A FAIRLY SOLID ATTACK PLAN. IN THIS, THEY WERE ONLY PARTIALLY SUCCESSFUL. AN OPERATION OF THIS SCOPE AND MAGNITUDE ENCOMPASSED SO MANY CRITICAL EVENTS THAT PARTIAL FAILURES WERE INEVITABLE. NEVERTHELESS, THE 14 OCTOBER RAID WAS THE MOST SUCCESSFUL OF THE SERIES. ALTHOUGH FEAF ATTEMPTED TO RETURN TO BALIKPAPAN ON 18 OCTOBER, ADVERSE WEATHER FORCED THE AMERICANS TO SETTLE FOR THE DAMAGE INFLICTED ON THE CLIMACTIC FOURTH RAID.

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<sup>320</sup> Air Advisory Board, 28B, 83-87.

<sup>321</sup> V Bomber Command, *Heavy Bomber Strikes of Sept. 30, Oct. 10, and Oct. 14, 1944 on Padansari Refinery, Edeleanu (Bendex) Plant, and Paraffin & Lubricating Oil Refinery at Balikpapan, Borneo*, n.p.

<sup>322</sup> Air Advisory Board, 83.



IN GENERAL, THE PLAN FOR 14 OCTOBER WAS SIMILAR TO THAT USED FOUR DAYS EARLIER, WITH BUT A FEW IMPORTANT MODIFICATIONS. THE MOST SIGNIFICANT CHANGE WAS INCREASING THE AMOUNT OF FIGHTER COVER FOR THE BOMBER FORCE. FIFTH AIR FORCE TRIPLED THE NUMBER OF P-38 SQUADRONS BY DIRECTING EACH OF ITS P-38 GROUPS TO FLY ONE SQUADRON. IN RESPONSE, THE 49<sup>TH</sup> FIGHTER GROUP AGAIN SCHEDULED ITS 9<sup>TH</sup> FIGHTER SQUADRON, THE 8<sup>TH</sup> FIGHTER GROUP SCHEDULED ITS EXPERIENCED 80<sup>TH</sup> FIGHTER SQUADRON, AND THE 475<sup>TH</sup> FIGHTER GROUP ASSIGNED ITS 432<sup>ND</sup> FIGHTER SQUADRON. WHILE THE FIRST TWO FIGHTER SQUADRONS WERE ALREADY AT MOROTAI, THE 432<sup>ND</sup> HAD TO STAGE IN FROM BIAK ON 13 OCTOBER. AT THE SAME TIME, XIII FIGHTER COMMAND PLANNED TO USE ITS P-38 GROUPS BASED AT SANSAPOR AND MIDDLEBURG, NEW GUINEA. MEANWHILE, THE V BOMBER COMMAND GROUPS WERE DETERMINED TO TAKE CARE OF THEMSELVES NO MATTER HOW MUCH FIGHTER ESCORT WAS ON THE SCHEDULE. LEFT UNESCORTED ON 10 OCTOBER, THESE GROUPS WERE CONVINCED MORE THAN EVER OF THE NEED FOR MASS. ACCORDINGLY, V BOMBER COMMAND PLANNED TO EMPLOY A "V" FORMATION MADE UP OF THREE GROUP DIAMONDS.<sup>323</sup> WHILE THE FEAF PLANNERS WERE TWEAKING THE ATTACK ORDER, THE 63<sup>RD</sup> AND 868<sup>TH</sup> BOMB SQUADRONS CONTINUED THEIR NIGHT SNOOPER ATTACKS. THE JAPANESE NIGHT DEFENSES WERE MOST ACTIVE ON 13 OCTOBER, AS AMERICAN CREWS NOTED INTENSE, ACCURATE ANTI-AIRCRAFT FIRE AND ONE UNIDENTIFIED AIRCRAFT AIRBORNE.<sup>324</sup> PRESUMABLY, THIS WAS ONE OF S902 *HIKOTAI*'S TWENTY-FOUR *GEKKO* NIGHT FIGHTERS.<sup>325</sup>

THE 14 OCTOBER MISSION BEGAN WHEN 117 B-24S TOOK OFF FROM NOEMFOOR, BIAK, AND OWI. OF THESE, ONE HUNDRED ACTUALLY BOMBED BALIKPAPAN. THE 35<sup>TH</sup> FIGHTER GROUP LAUNCHED SIXTEEN P-47S, OF WHICH ALL BUT ONE MADE IT TO THE PRE-STRIKE FIGHTER SWEEP. THE DRAMATIC INCREASE IN THE SIZE OF THE FIGHTER ESCORT CAME FROM THE 94 P-38S THAT LAUNCHED OUT OF MOROTAI AND WESTERN NEW GUINEA.<sup>326</sup> V FIGHTER COMMAND DIVIDED ESCORT RESPONSIBILITIES AMONG ITS SQUADRONS. THE 9<sup>TH</sup> FIGHTER SQUADRON SHEPHERDED THE FIFTH AIR FORCE BOMBERS AT THE FRONT OF THE STRIKE PACKAGE WHILE THE 432<sup>ND</sup> ASSUMED RESPONSIBILITY FOR THE XIII BOMBER COMMAND GROUPS IN TRAIL. RATHER THAN CONVERGING WITH THE BOMBERS IMMEDIATELY PRIOR TO THE TARGET, THE 432<sup>ND</sup> OVERTOOK ITS ASSIGNED BOMBER GROUPS FORTY-FIVE MINUTES PRIOR TO THE BOMB RUN.<sup>327</sup> APPARENTLY, THESE MODIFIED ESCORT TACTICS "WERE SUCCESSFUL...IN KEEPING THE 'SPOTTERS' AWAY."<sup>328</sup>

FIFTEEN OF THE 35<sup>TH</sup> FIGHTER GROUP'S P-47S ARRIVED OVER BALIKPAPAN AT 10:20 AND IMMEDIATELY ENGAGED A STRONG FORCE OF JAPANESE INTERCEPTORS. THE P-47S CLAIMED NINETEEN

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<sup>323</sup> Craven and Cate, vol. 5, 321.

<sup>324</sup> Thirteenth Air Force, *Attacks against Strategic Enemy Oil Centers*, n.p.

<sup>325</sup> Uchida, n.p.

<sup>326</sup> Far East Air Forces, "Number of Airborne and Completed Sorties against Balikpapan."

<sup>327</sup> JOHN STANAWAY, *POSSUM, CLOVER & HADES: THE 475<sup>TH</sup> FIGHTER GROUP IN WORLD WAR II*. (ATGLEN, PA: SCHIFFER MILITARY/AVIATION HISTORY, 1993), 207.

<sup>328</sup> Air Advisory Board, 14.

JAPANESE FIGHTERS AT A COST OF ONE OF THEIR OWN.<sup>329</sup> THE 35<sup>TH</sup> WAS STILL ENGAGED OVER MANGGAR WHEN THE FIFTH AIR FORCE BOMBERS AND FIGHTERS ARRIVED.<sup>330</sup> THE HAND-OFF BETWEEN THE FIGHTER GROUPS WAS APPARENTLY ROUGH, AS A P-38 MISTAKENLY SHOT UP A P-47 WHICH LATER CRASHED IN THE WATER.<sup>331</sup> THE FIRST P-38 PILOTS TO ENGAGE WERE MAJOR GERRY JOHNSON AND MAJOR TOMMY MCGUIRE, TWO OF THE LEADING ACES OF THE PACIFIC WAR, WHO WERE FLYING IN THE SAME FLIGHT. MCGUIRE, WHO WAS AMERICA'S SECOND LEADING ACE IN THE WAR, WAS A PILOT IN THE 475<sup>TH</sup> FIGHTER GROUP. ON THIS DAY, HOWEVER, HE WAS FLYING WITH THE RIVAL 49<sup>TH</sup> FIGHTER GROUP IN A BORROWED AIRCRAFT. JOHNSON AND MCGUIRE'S FLIGHT CLAIMED SEVEN AIRCRAFT DESTROYED THIS DAY, EVEN THOUGH THEY HAD ONLY THREE AIRCRAFT IN THEIR FLIGHT.<sup>332</sup> THE FIFTH AIR FORCE "V," LED BY THE 90<sup>TH</sup> BG, FOLLOWED THE P-38S INTO THE TARGET. THESE FIFTY-TWO B-24S BOMBED EDELEANU PRECISELY ON SCHEDULE. ACCORDING TO THE INTELLIGENCE SUMMARY, THE JAPANESE FIGHTER "INTERCEPTION [WAS] AGGRESSIVE BUT LACKED [THE] COORDINATED ATTACKS EXPERIENCED ON PREVIOUS RAIDS."<sup>333</sup> BECAUSE OF THIS, V BOMBER COMMAND LOST ONLY ONE AIRCRAFT AND PUT 85% OF ITS 270 BOMBS ON TARGET AT EDELEANU.<sup>334</sup>

REPEATING THE ERROR FROM THE PREVIOUS RAID, THE XIII BOMBER COMMAND GROUPS ARRIVED LATE, DISRUPTING THE CAREFULLY DEVISED BOMBING PLAN. THE COMPACT BOMBER TRAIN WAS NOT SO IMPORTANT, HOWEVER, DUE TO THE SIXTEEN P-38S OF THE 475<sup>TH</sup> FIGHTER GROUP THAT LED THE LAST TWO BOMB GROUPS INTO THE TARGET. LISTENING TO THE 49<sup>TH</sup> FIGHTER GROUP'S FIGHT ON THE RADIO, THE TRAIL P-38 SQUADRON PICKED UP AND ENGAGED A GROUP OF JAPANESE FIGHTERS OVER THE WATER BETWEEN MANGGAR AND THE TOWN OF BALIKPAPAN.<sup>335</sup> WITH P-38S OCCUPYING MOST OF THE JAPANESE AIRCRAFT, THE FORTY-NINE B-24S OF XIII BOMBER COMMAND CONCENTRATED ON THEIR ATTACK.<sup>336</sup> THEY ACHIEVED GOOD BOMBING RESULTS, IN SPITE OF A JAPANESE AIRCRAFT FLYING OVER THE REFINERY AREA AT 2-3,000' "VAINLY ATTEMPTING TO LAY A SMOKE SCREEN OVER IT."<sup>337</sup> THE 475<sup>TH</sup> FIGHTER GROUP P-38S REMAINED ON STATION THROUGHOUT THE BOMB RUN AND PROTECTED THE BOMBERS FROM HALFHEARTED ATTACKS BY JAPANESE INTERCEPTORS DURING THE WITHDRAWAL.<sup>338</sup> IN DOING SO, THEY PARTLY MADE UP FOR THE POOR SHOWING OF XIII FIGHTER

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<sup>329</sup> Craven and Cate, vol. 5, 321; Far East Air Forces, "Number of Airborne & Completed Sorties against Balikpapan."

<sup>330</sup> Ferguson and Pascalis, 271.

<sup>331</sup> Stanaway, 208; Craven and Cate, vol. 5, 321; Air Evaluation Board, 83.

<sup>332</sup> Ferguson and Pascalis, 271.

<sup>333</sup> Air Evaluation Board, 16.

<sup>334</sup> Craven and Cate, vol. 5, 321; V Bomber Command, *Heavy Bomber Strikes of Sept. 30, Oct. 10, and Oct. 14, 1944 on Padansari Refinery, Edeleanu (Bendex) Plant, and Paraffin & Lubricating Oil Refinery at Balikpapan, Borneo*, n.p.

<sup>335</sup> Stanaway, 207.

<sup>336</sup> Craven and Cate, vol. 5, 321.

<sup>337</sup> History, 424<sup>th</sup> Bomb Squadron, Combat Mission Report, 15 October 1944, 1-2.

<sup>338</sup> Stanaway, 207-208.

COMMAND. OF THE FORTY-TWO THIRTEENTH AIR FORCE P-38S LAUNCHED FOR THE MISSION, ONLY SIX (FROM THE 68<sup>TH</sup> FIGHTER SQUADRON) ARRIVED OVER THE TARGET.<sup>339</sup>

THE RESULTS FROM THIS MISSION WERE IMPRESSIVE. FEAF'S BOMBERS SMASHED FACILITIES THROUGHOUT THE AREA. ALLIED PHOTO INTERPRETERS REPORTED THAT THE BOMBERS HIT EDELEANU PARTICULARLY HARD, WITH THE SULFUR DIOXIDE PLANT, SULFURIC ACID PLANT, PLANT #1, BOILER AND POWER HOUSES, AND STORAGE FACILITIES DESTROYED. IN THE COOLIE BARRACKS AREA, BOMBS DEMOLISHED FIFTY-SIX OF SEVENTY-FOUR BUILDINGS. IN THE TANK FARM, THE BOMBERS DESTROYED THREE LARGE OIL TANKS WITH THREE MORE DAMAGED. AT THE PARAFFIN AND LUBRICATING OIL PLANT, THE RAID DAMAGED THE DISTILLING UNIT, LUBRICATING OIL PUMPS, AND STORAGE TANKS. FEAF ACHIEVED ALL OF THIS FOR THE COST OF TWO B-24S (ONE LOST EN-ROUTE AND ONE LOST IN THE TARGET AREA) AND FOUR P-47S (TWO TO COMBAT OPERATIONS AND TWO ON RECOVERY). AGAIN, THE AIR-TO-AIR REPORTS WERE EXTRAVAGANT, WITH FIGHTER PILOTS AND BOMBER GUNNERS CLAIMING FORTY-FOUR JAPANESE AIRCRAFT.<sup>340</sup>

FEAF WAS CONVINCED THAT BALIKPAPAN WAS IN ITS DEATH THROES AFTER THE 14 OCTOBER RAID. THEREFORE, IT PLANNED ONE MORE MISSION TO FINISH OFF UNDAMAGED PORTIONS OF THE FACILITY. THIS LAST MISSION WAS TO BE A THIRTEENTH AIR FORCE SHOW. THE 5<sup>TH</sup> AND 307<sup>TH</sup> BOMB GROUPS WERE TO ATTACK WITH THE 8<sup>TH</sup> AND 347<sup>TH</sup> FIGHTER GROUPS ESCORTING. THE PLANNERS WANTED TO HIT SOME OF THE REFINERY'S BACK-UP SYSTEMS, SUCH AS THE OLD REFINERY, THAT HAD NOT YET RECEIVED MUCH ATTENTION.<sup>341</sup> THE RESULTS OF THIS MISSION WERE DISAPPOINTING. THE FIFTY-TWO BOMBERS FOUND THE TARGET COMPLETELY COVERED BY CLOUDS. SEVENTEEN AIRCRAFT DROPPED BASED ON ESTIMATED TIME OF ARRIVAL, BUT NO-ONE EXPECTED ACCURATE RESULTS USING THIS METHOD.<sup>342</sup> THE POOR WEATHER AFFECTED THE JAPANESE DEFENSES AS MUCH AS THE BOMBING, AS THE AMERICAN FORCES ENCOUNTERED NO OPPOSITION ON THEIR LAST REFINERY ATTACK. NEVERTHELESS, THIRTEENTH AIR FORCE STILL LOST ONE B-24 AND TWO P-38S, DEMONSTRATING THE DANGERS INVOLVED IN LONG-RANGE OVER-WATER FLIGHTS.<sup>343</sup> THE DOWNED BOMBER CAME FROM THE 424<sup>TH</sup> BOMB SQUADRON; ITS HISTORY RECORDED THAT "THIS AIRCRAFT WAS SEEN TO GO INTO AN EXTREMELY STEEP BANK AND PEEL AWAY FROM THE FORMATION" AFTER BREAKING THROUGH "AN EXTREMELY HEAVY AND TURBULENT FRONT" TEN MILES AWAY FROM THE TARGET AREA.<sup>344</sup> THAT SAME WEATHER HAMPERED FIGHTER OPERATIONS, AS ONLY EIGHT OF THE SEVENTY-FIVE ESCORT FIGHTERS ACTUALLY REACHED BALIKPAPAN.<sup>345</sup> THIS UNSATISFYING MISSION NONETHELESS CLOSED THE BOOKS ON THE "PLOESTI OF THE PACIFIC."

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<sup>339</sup> Craven and Cate, vol. 5, 321.

<sup>340</sup> Air Evaluation Board, 83, 88-89.

<sup>341</sup> Air Evaluation Board, 28a.

<sup>342</sup> Craven and Cate, vol. 5, 322; Far East Air Forces, "Number of Airborne & Completed Sorties against Balikpapan."

<sup>343</sup> Air Evaluation Board, 83.

<sup>344</sup> History, 424 Bomb Squadron, "Narrative Combat Report of Mission #307-343," 18 October 1944, 2.

<sup>345</sup> Craven and Cate, vol. 5, 322.

## RESULTS AND ASSESSMENT

THE DEBATE ABOUT THE MERITS OF THE BALIKPAPAN OPERATION STARTED ALMOST AS SOON AS THE B-24 ENGINES SHUT DOWN ON 18 OCTOBER 1944. FEAR HAD DIFFICULTY GAINING A CONSENSUS AMONG ITS OWN INTELLIGENCE EXPERTS ON THE LEVEL OF DAMAGE INFLICTED ON THE REFINERY. GIVEN THIS, IT IS NO SURPRISE THAT AIR COMMANDERS NEVER ANSWERED MANY QUESTIONS CONCERNING OPERATIONAL AND STRATEGIC EFFECTS. THIS PERSISTED EVEN AFTER THE US STRATEGIC BOMBING SURVEY (USSBS) COMPLETED ITS WORK, AS THE BALIKPAPAN PRODUCTION RECORDS EITHER DISAPPEARED IN BORNEO OR WERE DESTROYED BY FIRE IN THE TOKYO BOMBINGS. NEVERTHELESS, THE FRAGMENTARY BALIKPAPAN RECORDS AND THE INTERVIEWS CONDUCTED BY THE USBSS POINT TO SOME TENTATIVE CONCLUSIONS.

THE EASIEST PART OF THE OPERATION TO QUANTIFY IS THE AMERICAN TOLL. FROM 30 SEPTEMBER TO 18 OCTOBER 1944, 321 FEAR B-24 SORTIES FLEW AN AVERAGE OF 2,400 MILES TO DROP 2,328 BOMBS WEIGHING 433.3 TONS ON THE BALIKPAPAN OIL FACILITIES. ADDITIONALLY, SIXTY-SIX P-38 AND THIRTY P-47 SORTIES SWEEPED THE TARGET, WITH THE FIGHTERS FLYING AN AVERAGE OF 1,700 MILES PER SORTIE. ON THESE SORTIES, FEAR LOST TWENTY-TWO B-24S, THREE P-38S, AND SIX P-47S. IN TOTAL, 151 AIRCREW LOST THEIR LIVES, A NUMBER THAT WOULD HAVE BEEN MUCH HIGHER BUT FOR THE SIXTY AIRCREW RESCUED BY CATALINAS AND THE *USS MINGO*.<sup>346</sup> THE LOSS NUMBERS WOULD HAVE UNDOUBTEDLY BEEN HIGHER STILL HAD NOT FEAR RADICALLY CHANGED ITS TACTICS AFTER THE FIRST TWO RAIDS. THE LOSS RATE FOR THE BOMBERS WAS FOUR TIMES AS HIGH ON THE FIRST TWO MISSIONS AS ON THE SUCCEEDING SORTIES. THIS WAS IN SPITE OF THE FACT THAT JAPANESE DEFENSES GREW THROUGHOUT THE OPERATION. IN RETURN FOR ITS LOSSES, FEAR CLAIMED THE DESTRUCTION OF AT LEAST 129 JAPANESE AIRCRAFT.<sup>347</sup> THE COMMANDER OF THE 381<sup>ST</sup> *KOKUTAI* DISPUTED THIS NUMBER, AS HE CLAIMED HIS UNIT LOST ONLY EIGHTEEN AIRCRAFT.<sup>348</sup> EITHER WAY, FEAR FIGHTER ESCORTS CLEARLY KEPT THE PRESSURE OFF OF THE BOMBERS, ALLOWING FAR GREATER ACCURACY FOR EACH BOMB RUN.

FEAR WAS INITIALLY OPTIMISTIC ABOUT DAMAGE TO THE REFINERIES, ESPECIALLY WITH SMOKE PLUMES RISING AS HIGH AS 23,000' ON 10 AND 14 OCTOBER. HOWEVER, THE MORE FEAR ANALYZED THE BOMB DAMAGE, THE MURKIER THE SITUATION BECAME. THE 29 OCTOBER 1944 ALLIED AIR FORCE INTELLIGENCE SUMMARY OFFERED A PARTICULARLY HARSH CRITIQUE, RELAYING THAT "THE DAMAGE INFLICTED, CONSIDERING THE WEIGHT OF THE ATTACKS, SEEMS TO BE SURPRISINGLY SMALL."<sup>349</sup> AS THE SWPA AIR EVALUATION BOARD (AEB) REPORT CANDIDLY ADMITTED:

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<sup>346</sup> Air Evaluation Board, 1.

<sup>347</sup> Air Evaluation Board, 1-3.

<sup>348</sup> Uchida, n.p.

<sup>349</sup> ALLIED AIR FORCES INTELLIGENCE, SUMMARY NO. 247, 29 OCTOBER 1944, AIR FORCE HISTORICAL RESEARCH AGENCY, MAXWELL AIR FORCE BASE, AL.

MANY AND VARIED REPORTS WERE RECEIVED CONCERNING THE RESULTS OF THE VARIOUS STRIKES AGAINST THE BALIKPAPAN AREA. UNIT MISSION REPORTS VARIED IN STATISTICS AND ASSESSMENTS. BOMB DAMAGE ASSESSMENT VARIED FROM THE ESTIMATE THAT THE BALIKPAPAN REFINERIES WERE TOTALLY DESTROYED TO THE ASSUMPTION THAT THE PLANT WAS STILL IN OPERATION AND THAT THE PRODUCTION WAS ONLY SLIGHTLY REDUCED.<sup>350</sup>

THE AIR EVALUATION BOARD TOOK THE MIDDLE GROUND IN THIS DEBATE, ASSESSING THAT PANDASARI WAS OUT OF ACTION BUT COULD BE REBUILT QUICKLY, EDELEANU WAS COMPLETELY DESTROYED, THE PARAFFIN AND LUBRICATING PLANT WAS DAMAGED BUT CAPABLE OF REPAIR, AND THE CRACKING PLANT WAS STILL IN OPERATION.<sup>351</sup> AFTER THE WAR, THE NETHERLANDS EAST INDIES OIL REHABILITATION TEAM DETERMINED THAT THE AEB ASSESSMENT WAS CLOSE TO GROUND TRUTH. THE ONLY SIGNIFICANT DIFFERENCES WERE THAT THE LUBRICATING OIL PLANT WAS DESTROYED BY FIRE AND THE CRACKING PLANT WAS UNABLE TO FUNCTION FULLY SINCE IT NEVER RECEIVED ANY MORE WAXY DISTILLATE FOR ITS VAPOR-PHASE CRACKING PROCESS.<sup>352</sup>

WHILE FEAF WAS ON-TARGET WITH ITS FINAL DETERMINATION OF TACTICAL EFFECTS, THE ORGANIZATION'S OPERATIONAL ANALYSIS IS MORE OPEN TO DEBATE. THE AEB REPORT PERCEPTIVELY DECLARED "STUDIES FOR THE SELECTION OF STRATEGIC TARGETS SHOULD INCLUDE THE OVERALL AND ULTIMATE STRATEGIC EFFECT UPON THE ENEMY AS WELL AS THE IMMEDIATE EFFECT CAUSED BY THE DAMAGE AND DESTRUCTION."<sup>353</sup> THE REPORT CLAIMED THAT THE PREDICTED EFFECTS OCCURRED WITH REGARDS TO KENNEY'S PRIMARY OPERATIONAL OBJECTIVE, THE DENIAL OF JAPANESE AVIATION FUEL TO THE PHILIPPINES. TO SUPPORT THIS, THE REPORT REFERENCED INTELLIGENCE REPORTS THAT "FIELD COMMANDERS WERE FRANTICALLY CALLING FOR MORE AVIATION GASOLINE IN THE SUCCEEDING WEEKS FOLLOWING THESE RAIDS." THE REPORT'S SECOND PIECE OF EVIDENCE CONCERNED A LARGE JAPANESE ATTACK AGAINST THE CENTRAL PHILIPPINES TWO MONTHS AFTER THE RAID. THE REPORT CLAIMED THAT ONLY FOUR AIRCRAFT FROM THESE TWO GROUPS REACHED THE TARGET AND THAT "INTELLIGENCE AGENCIES ATTRIBUTED THIS FAILURE DIRECTLY TO THE BALIKPAPAN RAIDS."<sup>354</sup> WHILE SOME JAPANESE AIR UNITS UNDOUBTEDLY SUFFERED FUEL SHORTAGES, THE PROBLEM SEEMS TO NOT HAVE BEEN AS WIDESPREAD AS THE AEB REPORT SUGGESTS. INDEED, THE OPERATIONS OFFICER FOR THE JAPANESE NAVY'S SECOND AIR FLEET IN THE PHILIPPINES, COMMANDER MORIYOSHI YAMAGUCHI, LATER CLARIFIED THAT "ALTHOUGH WE DID NOT HAVE PLENTY OF GASOLINE, WE HAD ENOUGH TO TAKE CARE OF THE PLANES ON HAND." HE WENT ON TO SAY THAT THE RAPID DECLINE IN NAVAL AIR STRENGTH IN THE PHILIPPINES WAS CAUSED BY AMERICAN AIR ACTION AND THE LACK OF SPARE PARTS RATHER THAN FUEL SHORTAGES.<sup>355</sup>

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<sup>350</sup> Air Evaluation Board, 28.

<sup>351</sup> Air Evaluation Board, 28-29.

<sup>352</sup> DE BLANK, 1-8.

<sup>353</sup> Air Evaluation Board, 3.

<sup>354</sup> Air Evaluation Board, 25-26.

<sup>355</sup> Commander Moriyoshi Yamaguchi, Imperial Japanese Navy, Operations Officer, Second Air Fleet, interrogated by Lt. Cmdr. James A. Field, USNR, 26 October 1945, in *The United States Strategic*

IF WIDESPREAD FUEL SHORTAGES DID NOT OCCUR IN THE PHILIPPINES, THEN WHAT WERE THE DISCONNECTS BETWEEN KENNEY'S PLANS AND THE ACTUAL EVENTS? THE FIRST AND MOST OBVIOUS REASON THAT THE BORNEO RAIDS HAD NO EFFECT ON PHILIPPINE AIR OPERATIONS WAS THAT BALIKPAPAN SHIPPED LITTLE IF ANY FUEL TO THE PHILIPPINES. THE SPLIT BETWEEN ARMY AND NAVY LOGISTICS MEANT THAT BALIKPAPAN ALMOST EXCLUSIVELY SHIPPED AVIATION FUEL TO NAVY SUPPLY DEPOTS. THE JAPANESE ARMY, SUPPLIED FROM SUMATRAN REFINERIES, HAD THE PRIMARY RESPONSIBILITY FOR AIR OPERATIONS IN THE PHILIPPINES. WHILE ANY SHIPMENTS INTO THE PHILIPPINES WERE BECOMING INCREASINGLY DIFFICULT, THE JAPANESE ARMY HAD MANY MONTHS TO STOCKPILE FUEL SUPPLIES.<sup>356</sup> ADMITTEDLY, THOUGH, BALIKPAPAN MIGHT HAVE STARTED SHIPMENTS TO THE NAVY'S FIRST AIR FLEET IN THE SOUTHERN PHILIPPINES ONCE INVASION BEGAN AND THEN EXPANDED THIS SUPPORT WHEN THE MUCH LARGER SECOND AIR FLEET ARRIVED AT THE END OF OCTOBER.

THE JAPANESE DID NOT DO THIS, HOWEVER, DUE TO THE SHIPPING SITUATION IN THE SOUTH PACIFIC. AFTER THE WAR, DUTCH INVESTIGATORS DETERMINED THAT THE AVAILABLE TANKER CAPACITY DROVE BALIKPAPAN'S PRODUCTION THROUGHOUT DURING THE WAR. REFINERY OUTPUT PEAKED IN 1943, WHEN THE HARBOR CONTAINED SEVERAL TANKERS EACH DAY AND MORE THAN TEN LARGE TANKERS ARRIVED EACH MONTH. IN THE FIRST MONTHS OF 1944, HOWEVER, BALIKPAPAN REDUCED REFINERY THROUGHPUT BY APPROXIMATELY 20%, IN RESPONSE TO THE DECREASING NUMBER OF SHIPS CALLING AT THE PORT. IN APRIL OF THAT YEAR, BALIKPAPAN SAW A DRAMATIC DROP IN TANKER TRAFFIC, WITH ONLY TWO OR THREE LARGE TANKERS ARRIVING BEFORE FEAF'S AIR RAIDS. ACCORDINGLY, THE 102<sup>ND</sup> FUEL DEPOT REDUCED THE DAILY PRODUCTION BY A FURTHER 20% AND OPERATED THE REFINERY ONLY EIGHT TO TEN DAYS PER MONTH. NO LARGE TANKERS CALLED AT BALIKPAPAN FROM OCTOBER 1944.<sup>357</sup>

THIS MAY, IN PART, HAVE JUST BEEN A MANIFESTATION OF JAPAN'S EVOLVING TRANSPORTATION STRATEGY OF BUILDING LARGE NUMBERS OF SMALLER TANKERS.<sup>358</sup> THE MORE IMPORTANT INDICATOR, THEREFORE, IS THAT BALIKPAPAN'S STORAGE TANKS REMAINED FULL SPITE OF THE WRECKED PRODUCTION FACILITIES. THE LIMITED OIL AVAILABLE FROM UNDAMAGED FACILITIES WAS ALL THAT WAS NECESSARY TO KEEP UP WITH LOCAL DEMAND. THIS DROVE THE JAPANESE DECISION NOT TO REPAIR MOST OF THE BOMB DAMAGE FROM THE 1944 RAIDS.<sup>359</sup> THESE REVELATIONS UNDOUBTEDLY CAME AS A GREAT SURPRISE TO THE FEAF INTELLIGENCE ANALYSTS WHO HAD CLAIMED THAT THE DESTRUCTION OF THE REFINERIES HAD REDUCED THE EFFICIENCY OF JAPANESE SHIPPING IN THE SOUTH PACIFIC BY 40%.

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Bombing Survey, Naval Analysis Division, Report no. 193, *Interrogations of Japanese Officials*, 182, online, Internet, 27 April 2005, available from <http://www.ibiblio.org/hyperwar/AAF/USSBS/IJO/IJO-44.html>.

<sup>356</sup> Griffith, 185.

<sup>357</sup> de Blank, 7-8.

<sup>358</sup> The United States Strategic Bombing Survey, Oil and Chemical Division, 88-89.

<sup>359</sup> de Blank, 8.

THEY WERE WIDE OF THE MARK WHEN THEY ASSERTED JAPANESE SHIPS WOULD HAVE TO CARRY LESS CARGO DUE TO THE LACK OF FUEL AT THE PORT.<sup>360</sup>

THE REASONS BEHIND THE JAPANESE SHIPPING SHORTAGE WERE MORE COMPLICATED THAN IT INITIALLY APPEARED. LIEUTENANT COMMANDER G. M. WILLIAMS, THE TANKER ANALYST IN THE USSBS OIL STUDY, ATTRIBUTED BALIKPAPAN'S LACK OF TANKER AVAILABILITY TO THE LOSSES CAUSED BY THE SUBMARINE AND AIR BLOCKADE. AS SUCH, IT WAS A RESULT OF THE NAVY'S PREMEDITATED AND CONCERTED EFFORT TO ATTACK THIS "WEAK SPOT IN JAPAN'S WAR ECONOMY." HOWEVER, AN ANALYSIS OF THE JAPANESE SHIPPING RECORDS REVEALS LITTLE CORRELATION BETWEEN TANKER LINVENTORIES AND EVENTS AT BALIKPAPAN. THE US NAVY'S BEGAN ATTACKING TANKERS EARLY IN THE WAR, BUT THE TANKER TONNAGE IN THE JAPANESE MERCHANT FLEET INCREASED INTO 1943 AND THEN REMAINED STABLE AT AROUND 800,000 TONS TO THE END OF 1944. THE JAPANESE WERE UNDOUBTEDLY SUFFERING HEAVY LOSSES DURING THIS PERIOD; HOWEVER, THEIR SHIPBUILDING PROGRAM KEPT PACE. THE PRECIPITOUS DECLINE IN JAPANESE TANKER STRENGTH, TO A LOW OF 248,000 TONS AT THE END OF THE WAR, DID NOT BEGIN UNTIL JANUARY OF 1945. THIS WAS A FULL YEAR AFTER THE FIRST OIL PRODUCTION DRAWBACKS IN BORNEO.<sup>361</sup>

SINCE THE JAPANESE HAD TANKERS AVAILABLE, THE DECREASE IN SHIPPING TO BALIKPAPAN WAS THE RESULT OF A DELIBERATE COST BENEFIT DECISION. THIS WAS CLEARLY CONNECTED TO THE INCREASED RISK OF AIR AND SUBMARINE ATTACK OPERATING AT WHAT WAS BECOMING THE EDGE OF JAPAN'S DEFENSIVE PERIMETER. THE FIRST REDUCTION IN BALIKPAPAN'S PRODUCTION CORRESPONDED WITH THE ESTABLISHMENT OF CONVOY ROUTES FOR ALL TYPES OF MERCHANT SHIPPING IN JANUARY 1944. IN LIGHT OF THE GREATER THREAT, JAPANESE SIMPLY FOUND IT MORE COST EFFECTIVE TO INCREASE PRODUCTION IN THE SUMATRA REFINERIES AND THEN SHIP IT VIA THE LESS DANGEROUS SEA ROUTES ALONG THE INDOCHINA COAST. THE JAPANESE INCREASINGLY FAVORED THE EASTERN REFINERIES AS THE THREAT LEVEL JUMPED IN THE SUMMER OF 1944. DURING JUNE AND JULY, US SUBMARINES, GUIDED BY ULTRA INTELLIGENCE, TOOK A TREMENDOUS TOLL OF JAPANESE SHIPPING IN PHILIPPINE WATERS, FORCING THE JAPANESE TO CLOSE THE MERCHANT CONVOY ROUTE BETWEEN BALIKPAPAN AND THE PHILIPPINES. AAF CONTRIBUTED TO THIS AS WELL, WITH AIR ATTACKS ON SHIPPING FORCING JAPAN TO CLOSE THE REMAINDER OF THE CONVOY ROUTES FROM BALIKPAPAN IN NOVEMBER.<sup>362</sup> WITH NO SECURE SHIPPING ROUTES, JAPAN ESSENTIALLY ABANDONED BALIKPAPAN IN DECEMBER 1944.<sup>363</sup> TO BE FAIR TO THE AMERICAN PLANNERS, IT IS NOT AT ALL CLEAR THAT MANY JAPANESE RECOGNIZED THIS STRATEGIC SITUATION PRIOR TO THE BOMBING RAIDS. THE IMPERIAL JAPANESE NAVY, IN FACT, WAS CONCENTRATING ITS AIR DEFENSES AROUND BALIKPAPAN AT THE TIME THAT IT WAS DIVERTING SHIPPING AWAY FROM IT.

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<sup>360</sup> Air Evaluation Board, 25.

<sup>361</sup> The United States Strategic Bombing Survey, Oil and Chemical Division, 83.

<sup>362</sup> THE UNITED STATES STRATEGIC BOMBING SURVEY, TRANSPORTATION DIVISION, *THE WAR AGAINST JAPANESE TRANSPORTATION 1941-1945* (WASHINGTON, D.C., US GOVERNMENT PRINTING OFFICE, 1947), 48-51; DREA, 155-157.

<sup>363</sup> The United States Strategic Bombing Survey, Oil and Chemical Division, 88.

EVEN THOUGH THE OPERATIONAL OBJECTIVES OF THE BALIKPAPAN ATTACKS WERE UNFULFILLED, KENNEY PLACED SOME STOCK IN THE POTENTIAL PSYCHOLOGICAL IMPACT. FROM THE VERY BEGINNING OF THE PACIFIC WAR, KENNEY ASSERTED THAT THE LOSS OF BALIKPAPAN COULD TRIGGER A JAPANESE SURRENDER. HOWEVER, IT APPEARS AS THOUGH THE JAPANESE WERE ALREADY ACTING AS THOUGH BALIKPAPAN WERE LOST. FURTHER, IT TOOK THE TOTAL DESTRUCTION OF THE JAPANESE WAR ECONOMY, FIRE BOMBING OF THE MAJOR URBAN CENTERS, THE COLLAPSE OF THE JAPANESE ARMY IN MANCHURIA, AND TWO ATOMIC BOMB ATTACKS TO FINALLY CONVINCE THE JAPANESE TO SURRENDER. THERE IS NO INDICATION THAT THE ATTACK ON BALIKPAPAN EVEN ENTERED INTO THE SURRENDER CALCULATIONS OF THE CABINET OR IMPERIAL COUNCILS IN TOKYO.<sup>364</sup>

IF THE BALIKPAPAN OPERATION DID NOT ACHIEVE THE PLANNED OPERATIONAL AND STRATEGIC EFFECTS, WHAT WERE THE OPPORTUNITY COSTS? KENNEY HAD AIRPOWER AVAILABLE TO HIM, AND IT WOULD HAVE MADE LITTLE SENSE TO HAVE LEFT IT IDLE. SINCE THE EVIDENCE INDICATES THAT THE THREAT TO SHIPPING WAS THE ELEMENT THAT MOST DROVE THE JAPANESE, FEAF COULD HAVE USED THE TREMENDOUS EFFORT EXPENDED IN THE BALIKPAPAN RAIDS TO FURTHER STRESS THE JAPANESE MERCHANT FLEET. THESE OPERATIONS WERE A LARGE PART OF FEAF'S MISSION AND CREWS WERE MUCH MORE EXPERIENCED AT FINDING AND ATTACKING SHIPS THAN STRIKING STRATEGIC INDUSTRIES. ALTERNATIVELY, FEAF COULD HAVE APPORTIONED THE AIR EFFORT IN MORE DIRECT ATTACKS ON AIR DEFENSES IN THE PHILIPPINES. KENNEY WAS TO BE UNPLEASANTLY SURPRISED IN THE COMING WEEKS WITH THE STRONG JAPANESE AIR RESPONSE TO THE LEYTE LANDINGS. AGGRESSIVE JAPANESE ATTACKS, COUPLED WITH UNFORESEEN DIFFICULTIES IN ESTABLISHING AMERICAN BASES, RESULTED IN AN AIR SUPERIORITY BATTLE THAT WAS, AT TIMES, TOUCH AND GO. THEREFORE, ANY EFFORT TO SUPPRESS SOME OF THESE AIR DEFENSES WOULD LIKELY HAVE HAD GREATER IMPACT ON THE PACIFIC WAR THAN THE BALIKPAPAN STRIKES.<sup>365</sup>

## CONCLUSION

OVERALL, THEREFORE, FEAF'S BALIKPAPAN OPERATION PRODUCED A MIXED RECORD. ON THE ONE HAND, IT WAS AN EXAMPLE OF TACTICAL INNOVATION BY THE LEADERS AND COURAGE BY THE FIGHTING CREWS. AT THE SAME TIME, BALIKPAPAN DEMONSTRATED THAT A TREMENDOUS EFFORT CAN BE MEANINGLESS IF NOT A PART OF A CAREFULLY THOUGHT-OUT PLAN TO ACHIEVE OPERATIONAL AND STRATEGIC RESULTS.

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<sup>364</sup> Griffith, 185.

<sup>365</sup> For a detailed discussion of FEAF's problems gaining air superiority during the Leyte operation, see Griffith, 186-206.



## CHAPTER 5

### OPPOSITE SIDES OF THE WORLD – COMPARISONS, CONTRASTS, AND ANALYSIS.

WHILE THE PLOESTI AND BALIKPAPAN OPERATIONS ARE INTERESTING FROM SIMPLY A HISTORICAL PERSPECTIVE, THEY ALSO PROVIDE LESSONS FOR TODAY. FIRST, IT IS HELPFUL TO SET THE TWO OPERATIONS SIDE-BY-SIDE TO ILLUMINATE SOME OF THE MOST SIGNIFICANT COMPARISONS AND CONTRASTS. MANY OF THESE POINTS PROVIDE SURPRISINGLY TIMELESS LESSONS FOR WAR-FIGHTERS AT THE TACTICAL, OPERATIONAL, AND STRATEGIC LEVEL.

### THE BEGINNINGS

THE PLANNING AND PREPARATION FOR EACH OPERATION WAS MARKED BY NAIVETÉ. SELECTION OF THE TARGETS WAS BASED ON AN ACADEMIC CONCEPT THAT HAD YET TO FACE THE TEST OF COMBAT. TO SATISFY THIS THEORY, ALLIED LEADERS SUPPLEMENTED INCOMPLETE INTELLIGENCE WITH OPTIMISTIC ASSUMPTIONS ABOUT THE TARGET AND THE ENEMY DEFENSES. IN BOTH EUROPE AND THE PACIFIC, BLOODY SETBACKS FORCED A RE-EVALUATION OF THE TACTICS AND STRATEGY.

THE CONCEPTUAL GLUE THAT HELD THESE CONCEPTS TOGETHER WAS, OF COURSE, THE INDUSTRIAL WEB THEORY PROMULGATED BY THE AIR CORPS TACTICAL SCHOOL IN THE DECADE PRECEDING THE WAR. SCHOOL INSTRUCTORS TAUGHT THAT PETROLEUM WAS A “NATIONAL ORGANIC SYSTEM,” THE DESTRUCTION OF WHICH WOULD HAVE CASCADING EFFECTS THROUGH THE REST OF THE ECONOMY. IN BOTH CASES, HOWEVER, THE EXPECTATIONS GENERATED BY THIS THEORY WERE UNREALISTIC. IN EUROPE, ALLIED STRATEGISTS HAD A CLEAR UNDERSTANDING OF PLOESTI’S ROLE IN THE GERMAN PETROLEUM NETWORK. DOCUMENTS CAPTURED AFTER THE WAR SHOWED A CLOSE CORRELATION BETWEEN ALLIED ESTIMATES AND ACTUAL ROMANIAN PRODUCTION. WHAT STRATEGISTS IGNORED, HOWEVER, WAS THAT OIL WAS NOT VITAL ENOUGH TO THE GERMAN ECONOMY TO BRING ABOUT THE EFFECTS PREDICTED BY THE THEORY. GERMAN FACTORY PRODUCTION AND TRANSPORTATION NETWORKS WERE POWERED MOSTLY BY COAL. JAPAN, ON THE OTHER HAND, WAS HIGHLY DEPENDENT ON OIL. WHEN JAPAN’S OIL SHIPMENTS COLLAPSED THE BEGINNING OF 1945, HER MAJOR INDUSTRIES WENT IDLE AND HER ECONOMY BECAME A SHAMBLES. HOWEVER, ALLIED LEADERS EXAGGERATED THE IMPORTANCE OF BALIKPAPAN WITHIN THE SYSTEM. WHILE NICKNAMED THE “PLOESTI OF THE PACIFIC,” BALIKPAPAN WAS NOT ITS EQUIVALENT. BALIKPAPAN PRODUCED ONLY 15% OF JAPANESE PRODUCTION AND SERVICED JUST ONE SEGMENT OF THE WAR EFFORT – THE JAPANESE NAVY.

IN BOTH CASES, THESE UNREALISTIC EXPECTATIONS LED THEATER AIR LEADERS TO ATTACK AS SOON AS THEY HAD BOMBERS IN RANGE. AGAINST PLOESTI, THE ARMY AIR FORCES OPENED THE STRATEGIC BOMBING OF EUROPE WITH THE RAMSHACKLE HALVERSON RAID IN 1942. NINTH AIR FORCE FOLLOWED THIS WITH THE TIDAL WAVE ATTACK APPROXIMATELY A YEAR LATER. IN SPITE OF THE HIATUS,

THIS WAS THE FIRST TIME NINTH AIR FORCE HAD A LARGE ENOUGH FORCE TO DO THE JOB. IN FACT, THE AAF SPECIFICALLY SUPPLEMENTED NINTH AIR FORCE WITH TWO BOMB GROUPS FROM ENGLAND AND A FRESH BOMB GROUP FROM THE US JUST FOR THE MISSION. IN THE PACIFIC, FEAF'S EARLY NIGHT RAIDS AGAINST BALIKPAPAN WERE TOO LIGHT AND INACCURATE TO CAUSE LASTING DAMAGE. WITH THE CAPTURE OF WESTERN NEW GUINEA, HOWEVER, FEAF WAS ABLE TO POSITION ITS FULL STRIKING POWER OF FIVE HEAVY BOMB GROUPS JUST WITHIN RANGE OF THE REFINERIES.

IN BOTH CASES, THE LEADERS' UNDERESTIMATION OF THE DEFENSES AND STRONG DESIRE TO ATTACK LED TO THE ADOPTION OF HIGHLY RISKY ATTACK PLANS. AGAINST PLOESTI, AIR LEADERS DISCOUNTED BOTH THE QUALITY AND QUANTITY OF THE REFINERY DEFENSES. IN DOING SO, THE AMERICANS DEMONSTRATED THEY UNDERSTOOD NEITHER THE SIGNIFICANT PARTICIPATION OF THE LUFTWAFFE NOR THE GERMANS' AWARENESS OF THE PLOESTI'S VULNERABILITY. BECAUSE OF THIS, THE AMERICANS PLANNED A MASS BOMBER ATTACK FLYING A LOW-LEVEL ROUTE. THE PLANNERS HOPED THAT THE PROFILE WOULD PROVIDE HIGHLY ACCURATE BOMBING ALONG WITH TACTICAL SURPRISE. THIS WAS A TREMENDOUS GAMBLE, AS THE UNESCORTED FORMATIONS WOULD BE TREMENDOUSLY VULNERABLE TO ANTI-AIRCRAFT GUNNERS AND INTERCEPTOR PILOTS WHO KNEW THEY WERE COMING. AGAINST BALIKPAPAN, THE FEAF LEADERSHIP DISMISSED THE JAPANESE FIGHTER DEFENSES PROTECTING THE REFINERIES. THEY ASSUMED THE ATROPHY OF JAPANESE AIRPOWER THEY HAD WITNESSED IN NEW GUINEA WAS REPRESENTATIVE OF THE THEATER AS A WHOLE. THEY WERE UNAWARE THAT JAPAN HARBORED SOME STRONG AIR DEFENSE UNITS, ONE OF WHICH THE JAPANESE NAVY DEDICATED TO THE DEFENSE OF THE OIL REFINERIES. BECAUSE OF THIS MISTAKE, FEAF DIRECTED ITS BOMBERS TO CONDUCT A LARGE-SCALE RAID AGAINST THE REFINERIES WITHOUT FIGHTER ESCORT. THIS WAS IN SPITE OF THE LESSONS LEARNED AGAINST SKILLED JAPANESE FIGHTERS DEFENDING RABAU AS WELL AS ELSEWHERE IN THE PACIFIC.

#### DISMAL FAILURE

IN EACH CASE, THE UNREALISTIC EXPECTATIONS OF THE THREAT PLUS AN UNWARRANTED CONFIDENCE IN THE ABILITY OF THE CREWS TO HANDLE THE TREMENDOUSLY DEMANDING SITUATIONS LED TO FAILURE AT THE TACTICAL AND STRATEGIC LEVELS.

IN THE PLOESTI ATTACK, AMERICAN HOPES FOR SURPRISE WERE DASHED FROM THE VERY BEGINNING, AS AXIS INTELLIGENCE ALERTED THE DEFENSES ALMOST AS SOON AS THE BOMBERS TOOK OFF. NOT ONLY DID THE GERMANS HAVE AN INDICATION THAT THE RAID WAS ON, THEIR INTEGRATED SYSTEM OF RADAR POSTS AND OBSERVER STATIONS PROVIDED ENOUGH INFORMATION FOR THEM TO IDENTIFY THE TARGET AND TIMING OF THE ATTACK. WHEN THE B-24S ARRIVED OVER THE TARGET, AXIS FIGHTERS WERE CONDUCTING COMBAT AIR PATROLS AND ANTI-AIRCRAFT GUNS WERE MANNED AND LOADED. THE COHESION OF THE INTRICATE B-24 ATTACK PLAN FELL APART WHEN THE LEAD GROUP

MADE A NAVIGATION ERROR APPROACHING THE TARGET. ONCE THIS OCCURRED, THE B-24s WERE NEVER GOING TO ACHIEVE THE DESIRED BOMBING RESULTS. THE CONFUSION PROBABLY JUST ADDED TO WHAT WAS INEVITABLY GOING TO BE A COSTLY RAID.

AS A RESULT, TIDAL WAVE WAS A LARGE DISAPPOINTMENT. NINTH AIR FORCE LOST FIFTY-THREE BOMBERS WITH FIFTY-FIVE OTHERS DAMAGED. THIS COMPRISED NEARLY TWO-THIRDS OF THE BOMBERS THAT MADE IT OVER THE TARGET. FURTHER, THE BOTCHED ATTACK PLAN LED TO POOR BOMBING RESULTS. COMING AT THE TARGET FROM UNPLANNED DIRECTIONS, MANY BOMBERS HIT WHATEVER TARGETS THEY COULD FIND OR JETTISONED THEIR BOMBS AWAY FROM THE TARGET. EVEN SO, THIS CREATED ENOUGH DESTRUCTION TO INTERRUPT PRODUCTION, WITH A FEW STRIKES TAKING THEIR TARGETS OUT OF THE WAR PERMANENTLY. NEVERTHELESS, AXIS FUEL REFINING QUICKLY RETURNED TO PRE-STRIKE LEVELS, AND THE GERMAN ECONOMY CONTINUED WITH HARDLY A HICCUP.

WITH THEIR MUCH SMALLER SCALE, THE FIRST TWO BALIKPAPAN RAIDS DID NOT INCUR QUITE THE COST OF THE TIDAL WAVE ATTACK. BUT, THEY ACHIEVED EVEN LESS STRATEGIC EFFECT. THE AUDACITY OF THE RAIDS IN NO WAY CAUGHT THE JAPANESE BY SURPRISE. THE DEFENDERS EXPECTED AIR RAIDS SOONER OR LATER, AND SPOTTER AIRCRAFT PROVIDED ACCURATE TACTICAL WARNING. IN BOTH OF THESE RAIDS, THE BOMB GROUPS' ATTACKS WERE UNCOORDINATED, WITH SOME SQUADRONS BOMBING INDIVIDUALLY. IN THIS CONFIGURATION, THE LIBERATORS WERE ILL PREPARED TO HANDLE THE STRONG, SKILLFUL, CENTRALLY-CONTROLLED JAPANESE DEFENSE. FOLLOWING THE DIRECTIONS OF THE GROUND CONTROLLER, JAPANESE FIGHTERS MAULED EACH OF THE THREE AMERICAN BOMB GROUPS PARTICIPATING IN THE FIRST TWO ATTACKS.

AS THE AMERICANS COUNTED THE SCORES, THEY REALIZED THAT OVER 60% OF THE BOMBERS SENT ON THE FIRST TWO RAIDS HAD BEEN LOST OR DAMAGED. THIS ROUGH TREATMENT ADDED WITH CHALLENGING WEATHER TO DEGRADE BOMBING ACCURACY. ON THE FIRST TWO RAIDS, FEAF COULD VERIFY ONLY NINE BOMB HITS AT THE EDGES OF THE DESIGNATED IMPACT AREAS. THIS LEVEL OF DAMAGE WAS NOT SUFFICIENT TO IMPAIR SERIOUSLY THE REFINERIES, MUCH LESS TAKE THEM OUT OF THE WAR.

## A FRESH START

IN BOTH OPERATIONS, LEADERS ANALYZED THEIR INITIAL FAILURES AND ADJUSTED THEIR PLANS. IN EUROPE, THE MONTHS BEFORE THE RESUMPTION OF THE RAIDS ALLOWED USSTAF NOT ONLY TO REASSESS TACTICS, BUT ALSO TO REVAMP THE STRATEGY OF OIL ATTACK. IN FEAF, THE WEEK HIATUS ALLOWED ONLY TACTICAL CHANGES, BUT THE CREWS ACCOMPLISHED THESE WITH SKILL AND IMAGINATION.

USSTAF ADAPTED A NEW STRATEGY AND IMPROVED TACTICS WHEN THE BOMBERS RETURNED TO THE ROMANIAN REFINERIES IN THE SPRING OF 1944. WITH NEARLY TWO YEARS OF STRATEGIC BOMBING UNDER THEIR BELT, USSTAF NOW HAD A MORE REALISTIC UNDERSTANDING OF THE GERMAN

WAR ECONOMY. THEY KNEW THAT GERMAN INDUSTRY WAS ROBUST ENOUGH TO COMPENSATE FOR A LOSS OF OIL PRODUCTION. HOWEVER, SPAATZ NOW HAD A DIFFERENT AIM. HE WANTED TO DESTROY THE AXIS OIL REFINERIES NOT TO AFFECT GERMANY ECONOMICALLY BUT TO DENY OIL TO THE GERMAN ARMED FORCES. TO ACCOMPLISH THIS MORE LIMITED END, SPAATZ EXPANDED THE EFFORT BY CAREFULLY PLANNING A BROAD AND SUSTAINED OPERATION AGAINST ALL THE MAJOR SOURCES OF GERMAN OIL. USSTAF STARTED THE NEW OIL ATTACKS WITH ONE MAJOR TACTICAL CHANGE: THE HEAVY BOMBERS WERE NEVER AGAIN DIRECTED TO STRIKE AT LOW ALTITUDE. EVEN SO, USSTAF'S COSTLY LOW-LEVEL FIGHTER ATTACK IN JUNE 1944 MAKES IT UNCLEAR THAT THE AMERICANS UNDERSTOOD THE REASONS FOR TIDAL WAVE'S FAILURE. AS THE OPERATION STRETCHED FROM APRIL TO AUGUST, FIFTEENTH AIR FORCE INTRODUCED A NUMBER OF OTHER TACTICAL INNOVATIONS, INCLUDING FIGHTER ESCORT, VARYING THE LENGTH OF THE BOMBER STREAM, BLIND BOMBING TECHNIQUES, AND TARGET SPOTTING.

IN THE END, USSTAF'S ADJUSTMENTS WERE EFFECTIVE STRATEGICALLY BUT DISAPPOINTING TACTICALLY. AS THE WAR REACHED ITS CLIMAX IN THE LAST HALF OF 1944, GERMAN OIL SHORTAGES BECAME INCREASINGLY ACUTE. THESE OIL SHORTAGES WERE DIRECTLY PROPORTIONAL TO THE BOMBING OF THE REFINERIES IN ROMANIA AND GERMANY. GERMAN LEADERS HIGHLIGHTED THE EFFECTIVENESS OF OIL SHORTAGES IN DERAILING THEIR MILITARY OPERATIONS. THE LUFTWAFFE AND THE WERMACHT WERE DENIED THE FUEL TO TRAIN AND EVENTUALLY TO MANEUVER, CEDING THE ADVANTAGES OF MODERN WAR TO THE ALLIES. HOWEVER, USSTAF'S SLOW RATE OF TACTICAL INNOVATION ALLOWED THE PLOESTI DEFENDERS TO KEEP PACE. AS SUCH, THE OPERATION WAS NOT ONE OF SURPRISE AND EXPLOITATION, BUT OF GRUELING ATTRITION. THE RESULTING COST WAS ENORMOUS, WITH THE MAAF PAYING 350 AIRCRAFT TO TAKE PLOESTI OUT OF THE WAR.

WITH ONLY A WEEK HIATUS AFTER THE FIRST TWO BALIKPAPAN RAIDS, FEF did not attempt to adjust the strategy of its operation. NOR, INDEED, IS THERE ANY INDICATION KENNEY THOUGHT THE STRATEGY WRONG. INSTEAD, FEF COMMANDERS CONCENTRATED ON SOLVING THE TACTICAL ISSUES HIGHLIGHTED BY THE UNACCEPTABLY HIGH LOSS RATES AND LOW BOMB DAMAGE. THESE INNOVATIONS WERE IMPRESSIVE IN THEIR NUMBER AND SCOPE. IN A WEEK OF FURIOUS EFFORT, FEF EXTENDED THE RANGE OF ITS FIGHTERS BY THREE HUNDRED MILES, CHANGED ITS BOMBER FORMATIONS, REWORKED ITS ORDNANCE LOADS, DEVELOPED AN ELECTRONIC COUNTERMEASURE PLAN, AND IMPLEMENTED A SERIES OF SUPPORTING NIGHT ATTACKS.

THE TACTICAL AND STRATEGIC RESULTS OF THE BALIKPAPAN BOMBING WERE THE INVERSE OF THE PLOESTI OUTCOMES. FEFs TACTICAL CHANGES GENERATED SUDDEN AND SIGNIFICANT BENEFITS. ON THE LATER MISSIONS, THE LOSS AND DAMAGE RATE TO BOMBERS FROM JAPANESE FIGHTERS PLUMMETED FROM 33.8% TO 9.3%, EVEN THOUGH THE NUMBER OF JAPANESE INTERCEPTORS INCREASED WITH EVERY RAID.<sup>366</sup> AS FEF COMMANDERS HAD HOPED, THE REDUCED PRESSURE ON THE BOMBERS RESULTED IN GREATLY IMPROVED BOMBING ACCURACY. THE BOMB GROUPS ATTAINED TIGHT

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<sup>366</sup> Air Advisory Board, 15, 21.

BOMB PATTERNS ON ALL THE MAJOR BALIKPAPAN COMPLEXES, PUTTING MOST OUT OF ACTION FOR THE REMAINDER OF THE WAR. AT THE OPERATIONAL AND STRATEGIC LEVELS, HOWEVER, FEAF DID NOT FULFILL ITS OBJECTIVES. KENNEY SHOWED A FAIRLY GOOD UNDERSTANDING OF THE JAPANESE PETROLEUM SYSTEM IN 1943, BUT HIS VIEWS BECAME BADLY DISTORTED BY THE FALL OF 1944. KENNEY DID NOT UNDERSTAND THAT BALIKPAPAN'S CAPACITY WAS ONLY A SMALL PART OF THE JAPANESE PETROLEUM PICTURE. ADDITIONALLY, HE FAILED TO PERCEIVE THAT THE AMERICAN OPERATIONS AGAINST JAPAN'S MARITIME FLEET HAD MADE THE EXPOSED BORNEO OIL FACILITIES IRRELEVANT. WHILE FEAF SHOULD BE COMMENDED FOR THE SKILL IT SHOWED IN DESTROYING THE REFINERIES, NO AMOUNT OF TACTICAL SUCCESS WOULD BRING THE DESIRED RESULTS.

### THE CAUSES OF STRATEGIC SUCCESS

THE FIRST KEY QUESTION, THEN, IS WHAT ATTRIBUTES ALLOWED AIR STRATEGISTS IN EUROPE TO CONNECT ENDS, WAYS AND MEANS MORE EFFECTIVELY THAN THOSE IN THE PACIFIC. WHILE THERE ARE UNDOUBTEDLY AN INFINITE NUMBER OF INFLUENCES, THREE MAJOR DETERMINANTS STAND OUT: THE LEADERSHIP CHARACTERISTICS OF CARL SPAATZ, THE UTILIZATION OF STRATEGIC INTELLIGENCE, AND THE BREADTH AND PERSISTENCE OF THE BOMBING OPERATION.

ALL LEADERS IMPRINT THEIR ORGANIZATIONS WITH CERTAIN ATTRIBUTES THAT ARE REFLECTIONS OF THEMSELVES. THIS IS CLEAR REGARDING USSTAF UNDER THE LEADERSHIP OF SPAATZ. SPAATZ, ONE OF THE MOST EXPERIENCED AND INSIGHTFUL AIR LEADERS PRIOR TO AND DURING WWII, BROUGHT UNIQUE BACKGROUND EXPERIENCES AND PERSONAL RELATIONSHIPS THAT EMPOWERED HIS ORGANIZATION TO SOLVE THE IMMENSE STRATEGIC CHALLENGES INVOLVED IN THE BOMBING OF GERMANY. IT IS DIFFICULT TO DISCERN SPAATZ'S DISTINCTIVE ATTRIBUTES WITH A CURSORY LOOK AT HIS CAREER PROFILE. INDEED, THE PROFILES OF ALL THE SENIOR AIR LEADERS HIGHLIGHTED IN THIS ACCOUNT (BRERETON, ENT, SMART, SPAATZ, EAKER, TWINING, KENNEY, WHITEHEAD, AND STREETT) SHOW A TREMENDOUS AMOUNT OF COMMONALITY. ALL BUT STREETT AND SMART WERE GRADUATES OF THE AIR CORPS TACTICAL SCHOOL, AND ALL ATTENDED COMMAND AND GENERAL STAFF COLLEGE OR ITS WARTIME EQUIVALENT. ALL BUT ENT AND WHITEHEAD HELD SENIOR COMMAND POSITIONS OVER A YEAR PRIOR TO THEIR INVOLVEMENT IN THE REFINERY STRIKES, AND HALF OF THE OFFICERS SERVED ON THE AIR STAFF OR WAR DEPARTMENT STAFF IN THE YEARS IMMEDIATELY PRECEDING THE WAR.

WHAT THESE OTHER OFFICERS COULD NOT REPLICATE, HOWEVER, WAS THE EXPERIENCE SPAATZ RECEIVED FROM THE MOST CENTRAL STAFF AND COMMAND ASSIGNMENTS PRIOR TO AND DURING THE EARLY YEARS OF THE WAR. FIRST AMONG THESE WAS SPAATZ'S TENURE AS CHIEF OF THE AIR CORPS PLANS DIVISION FROM 1940 UNTIL 1941 AND THEN CHIEF OF THE AIR STAFF FROM 1941 UNTIL 1942. WHILE SPAATZ WAS IN CHARGE, THE AIR STAFF PRODUCED AWPDP-1, THE INITIAL PLAN FOR AIRPOWER'S CONTRIBUTION TO THE DEFEAT OF THE AXIS, AND AWPDP-42, THE REFINEMENT OF AWPDP-1 COMPLETED AFTER THE AMERICAN ENTRY TO THE WAR. AS SUCH, SPAATZ WAS INTIMATELY FAMILIAR

WITH THE FORCE DEVELOPMENT, EQUIPMENT, AND BASING ISSUES UNDERPINNING THE STRATEGIC BOMBING PLAN IN EUROPE. ARNOLD THEN SENT SPAATZ TO COMMAND THE EMBRYONIC EIGHTH AIR FORCE AS IT BEGAN TO EXECUTE THE PLAN. ALTHOUGH SPAATZ RELINQUISHED CONTROL OF THE STRATEGIC BOMBING OPERATION WHEN HE ASSUMED COMMAND OF ALLIED AIR FORCES FOR THE TORCH LANDINGS, HE NEVERTHELESS REMAINED THE SENIOR US AIRMAN IN EUROPE. WHEN HE RETURNED TO ENGLAND TO COMMAND USSTAF, THEREFORE, NO OTHER OFFICER IN THE ARMY AIR FORCES HAD BEEN SO CONTINUOUSLY AND DEEPLY INVOLVED WITH THE PLANNING AND EXECUTION OF THE AIR PLAN AGAINST HITLER. AMONG OTHER THINGS, THIS GAVE SPAATZ AN APPRECIATION FOR THE PLAN'S LIMITATIONS, LEAVING HIM FREE TO DEVIATE WHEN IT DID NOT APPEAR TO BE WORKING.

IN ADDITION TO THE EXPERIENCE, SPAATZ'S STAFF AND COMMAND POSITIONS PROVIDED HIM WITH SOMETHING POTENTIALLY MORE CRITICAL: CLOSE RELATIONSHIP WITH THE MOST SENIOR LEADERS IN THE AMERICAN MILITARY. THE MOST IMPORTANT RELATIONSHIP WAS WITH ARNOLD. THE TWO SENIOR AIR LEADERS DEVELOPED A FRIENDSHIP DURING THE LEAN INTER-WAR YEARS. HOWEVER, THEIR PROFESSIONAL AND PERSONAL RELATIONSHIP FLOWERED WHEN SPAATZ SERVED AS ARNOLD'S ASSISTANT IN 1940 AND THE CHIEF OF AIR STAFF FROM 1941 TO 1942. SPAATZ KEPT THE AIR STAFF CLOSELY INFORMED OF EVENTS IN THE EUROPEAN THEATER. AT THE SAME TIME, HOWEVER, ARNOLD – EVER THE NOTORIOUS MICRO-MANAGER - TRUSTED HIS PROTÉGÉ ENOUGH TO GIVE HIM CONSIDERABLE LEEWAY WITH THE MOST IMPORTANT OF HIS OVERSEAS COMMANDS. WITHIN THE EUROPEAN THEATER, SPAATZ'S MOST IMPORTANT RELATIONSHIP WAS WITH EISENHOWER. SPAATZ GAINED EISENHOWER'S RESPECT AND TRUST WHILE SERVING AS HIS AIR COMMANDER IN ENGLAND AND NORTH AFRICA DURING THE FIRST YEARS OF THE WAR. THE BACKING OF THESE CRITICAL LEADERS ALLOWED SPAATZ TO DEVIATE FROM CURRENT STRATEGIES, EVEN WHEN THOSE EXPERIMENTS VARIED FROM DOCTRINE OR EVEN FROM THE SENIOR COMMANDER'S POLICY.

THIS EXPERIENCE IS IN STARK CONTRAST TO THAT OF BRERETON THE YEAR PRIOR. IT IS STRIKING THAT THE AIR STAFF GENERATED THE TACTICAL PLAN FOR TIDAL WAVE AND EIGHTH AIR FORCE PLANNERS REFINED IT. THESE PRELIMINARY PLANNERS DID NOT CONSULT THE UNIT EXPECTED TO EXECUTE THE ATTACK, NINTH AIR FORCE, UNTIL AFTER THE LOW-LEVEL PLAN HAD ALREADY BEEN APPROVED BY EISENHOWER. WHEN THE NINTH AIR FORCE GROUP COMMANDERS SAW THE PLAN, THEY PROTESTED LOUDLY AND CALLED FOR A CHANGE TO HIGH-LEVEL ATTACKS. BRERETON, HOWEVER, WAS UNWILLING TO PUSH THIS UP THE CHAIN. THE INTERFERENCE DID NOT STOP WITH THE PLANNING, HOWEVER. THE COHESION OF THE PLAN WAS FATALLY DISRUPTED WHEN ARNOLD AND THEN BRERETON PLACED LAST-MINUTE FLYING RESTRICTIONS ON CRITICAL RAID LEADERS. THE FACT THAT TACTICAL PLANNING WAS NOT ENTRUSTED TO THE FIELD AND THAT THE LOCAL COMMANDERS DID NOT FEEL ABLE TO EXPRESS THEIR OPINIONS POINTS TO INADEQUATE RELATIONSHIPS BETWEEN NINTH AIR FORCE COMMANDERS AND HIGHER HEADQUARTERS. ALTHOUGH ARNOLD OBVIOUSLY FELT CONFIDENT ENOUGH IN BRERETON TO APPOINT HIM TO A STRING OF COMMAND POSITIONS, BRERETON HAD BEEN PARTICULARLY DISCONNECTED FROM SOME OF THE CRITICAL PERIODS OF AIR CORPS DEVELOPMENT.

HIS SHORT INSTRUCTOR TOUR AT ACTS OCCURRED BEFORE THE DEVELOPMENT OF THE INDUSTRIAL WEB THEORY. HE SERVED IN JUNIOR COMMAND POSITIONS AFTERWARD, BUT DEVELOPED A REPUTATION AS "A DEBONAIR TYPE AND...NOT TOO SERIOUS A PRACTITIONER OF AIR POWER."<sup>367</sup> FINALLY, BRERETON HAD NOT BEEN INVOLVED WITH THE PRE-WAR BUILD-UP OR WITH THE DEVELOPMENT OF THE STRATEGIC BOMBING PLAN AGAINST GERMANY, AS HE WAS A CGSC INSTRUCTOR FROM 1935-1939 AND A FIELD COMMANDER THEREAFTER. ENT WAS EVEN MORE OUT OF THE MAINSTREAM, AS HE HAD BEEN A STUDENT AT CGSC FROM 1937 TO 1938 AND THEN HAD SERVED AS THE AIR ATTACHÉ TO PERU UNTIL 1942. WITH THIS BACKGROUND, ARNOLD DID NOT ENTRUST THOSE WITH THE BEST KNOWLEDGE OF THE LOCAL THREAT TO ACCOMPLISH THE TACTICAL PLANNING ON THIS CRITICAL MISSION.

THE KEY LESSON FROM THIS IS THAT COMBAT LEADERS AT ALL LEVELS SHOULD STRIVE FOR STRONG RELATIONSHIPS AND OPEN COMMUNICATIONS CHANNELS WITH SUPERIORS. HIGH LEVEL LEADERS ARE MORE INCLINED TO PROVIDE SUBORDINATES THE FLEXIBILITY TO ACCOMPLISH THEIR MISSIONS IF THEY UNDERSTAND SUBORDINATE NEEDS AND ARE COMFORTABLE THAT THE SUBORDINATE IS ACCOMPLISHING THE JOB SKILLFULLY.

ONCE EMPOWERED TO ACCOMPLISH THE MISSION, LEADERS IN THE FIELD THEN MUST MAKE SOME CRITICAL DECISIONS. ONE OF THE MOST IMPORTANT AREAS THAT COMMANDERS INFLUENCE IS THE INTERPRETATION AND USE OF INTELLIGENCE. SPAATZ PROVED SKILLFUL AT THIS IN HIS DEVELOPMENT OF THE OIL PLAN. THE THREE INTELLIGENCE AGENCIES MOST INVOLVED IN STUDIES OF THE GERMAN PETROLEUM INDUSTRY WERE THE US ARMY AIR FORCE'S COMMITTEE OF OPERATIONS ANALYSTS, THE BRITISH MINISTRY OF ECONOMIC WARFARE, AND THE ECONOMIC OBJECTIVES UNIT OF THE OFFICE OF STRATEGIC SERVICES IN LONDON. ORIGINALLY, THE COA REPORT WAS RELATIVELY COOL TOWARD OIL AS A TARGET SYSTEM. THE MEW, ON THE OTHER HAND, TOUTED THE FRAGILITY OF THE GERMAN PETROLEUM INDUSTRY, STATING THAT ATTACKING EITHER PLOESTI OR THE GERMAN SYNTHETIC PLANTS WOULD HAVE DRAMATIC EFFECTS. IN EARLY 1944, THE EOU, ARMED WITH SPAATZ'S SKETCHY ULTRA INFORMATION, MOVED BEYOND ITS ORIGINAL TASK OF SELECTING BOMB AIM POINTS AND CONDUCTED A SYSTEM-WIDE ANALYSIS OF THE GERMAN OIL SYSTEM. SPAATZ USED THIS REPORT TO PROD THE COA AND MEW TO REEVALUATE THEIR ORIGINAL CLAIMS. THIS WAS A SLOW PROCESS, WITH THE COA REFUSING TO MAKE ANY CONCESSIONS UNTIL APRIL 1944. SPAATZ PERSISTED, HOWEVER, AND ALL THREE ORGANIZATIONS EVENTUALLY CONVERGED TOWARD A CENTRIST POSITION: A COMPREHENSIVE ATTACK AGAINST BOTH PLOESTI AND THE SYNTHETIC OIL PLANTS COULD LEAD TO IMPORTANT STRATEGIC EFFECTS ON THE GERMAN MILITARY. THIS FINAL POSITION LAID THE INTELLECTUAL BASE OF SPAATZ'S ULTIMATELY SUCCESSFUL OIL PLAN.<sup>368</sup>

KENNEY FACED SIMILAR COMPETING ASSESSMENTS IN THE PACIFIC, BUT DID NOT ATTEMPT TO RESOLVE THE DISPUTE. IN WASHINGTON, D.C., THE COA ASSESSED THAT BALIKPAPAN WAS A TARGET

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<sup>367</sup> COPP, 274.

<sup>368</sup> Kreis, 137-138, 208-213; Major Scott E. Wuestoff, USAF, *The Utility of Targeting the Petroleum-based Sector of a Nations Economic Infrastructure* (Maxwell Air Force Base, AL: Air University Press, 1994), 5-10.

OF SECONDARY IMPORTANCE AND THAT SHIPPING WAS THE MOST VULNERABLE COMPONENT OF THE JAPANESE PETROLEUM SYSTEM. IN THEATER, HOWEVER, THE NETHERLANDS MILITARY OIL INTELLIGENCE SERVICE, NOT EQUIPPED TO ANALYZE THE JAPANESE SHIPPING SYSTEM, HIGHLIGHTED THE IMPORTANCE OF THE REFINERIES SHOULD THE JAPANESE OPERATE THEM AT MAXIMUM CAPACITY. KENNEY, ALREADY DISPOSED TO ATTACK THE REFINERIES, HAD TO INTEGRATE THESE ASSESSMENTS WITH FRAGMENTS OF ULTRA INTELLIGENCE. SOME OF THE ULTRA DATA WAS PARTICULARLY APPETIZING, INCLUDING INDICATIONS OF AVIATION FUEL SHORTAGES AND SHIPPING PATTERNS. THESE TID-BITS LED KENNEY TO SIDE WITH THE NMOIS ANALYSIS RATHER THAN RESOLVING THE DISPUTE. IN THE END, THE COA'S MORE BALANCED ANALYSIS WAS FAR CLOSER TO THE TRUTH.

IN THE IMMENSE COMPLEXITY OF LARGE-SCALE OPERATIONS, MILITARY LEADERS WILL INEVITABLY FACE CONFLICTING STRATEGIC INTELLIGENCE ANALYSES. WITH THIS, LEADERS WILL HAVE TO INTEGRATE REAL-TIME TACTICAL INTELLIGENCE. THE TEMPTATION, OF COURSE, IS TO SIMPLY DISCARD THE STRATEGIC INTELLIGENCE ANALYSIS THAT DOES NOT MATCH THE TREND OF THE CURRENT TACTICAL INTELLIGENCE. AN EVEN MORE DANGEROUS PITFALL IS TO FAVOR TACTICAL AND STRATEGIC INTELLIGENCE THAT FAVORS THE LEADER'S PRECONCEIVED COURSE OF ACTION. INSTEAD, MILITARY LEADERS SHOULD STRIVE TO USE COMPETING INTELLIGENCE ANALYSES TO FACILITATE THE REVISION AND REFINEMENT OF THE ORGANIZATION'S KNOWLEDGE OF THE THREAT. IF DONE WELL, THIS CAN EVENTUALLY RESULT IN A CONSENSUS AMONG THE INTELLIGENCE AGENCIES AND AN ACCURATE PICTURE OF THE ENEMY.

THE FINAL REASON FOR USSTAF'S RELATIVE STRATEGIC SUCCESS IS THAT THEY UNDERSTOOD AND OPERATED TO ACHIEVE PERSISTENT ATTACKS ACROSS THE BREADTH OF THE GERMAN OIL SYSTEM. AMERICAN AIRMEN IN EUROPE HAD LEARNED OF THE EXTRAORDINARY CAPABILITY OF GERMAN INDUSTRY TO RECOVER FROM EVEN THE HEAVIEST DAMAGE. THE GERMAN REACTION TO PLOESTI WAS PERHAPS THE FINEST EXAMPLE OF THIS, AS THE REFINERIES RETURNED TO PRE-STRIKE PRODUCTION LEVELS ONLY A MONTH AFTER THE TIDAL WAVE ATTACK. BECAUSE OF THIS, THE USSTAF PLANNERS KNEW THAT THEY HAD TO ATTACK ALL SOURCES OF GERMAN PETROLEUM REFINING. ACCORDINGLY, THE 1944 OIL PLAN CALLED FOR SIMULTANEOUS, HEAVY ATTACKS BY EIGHTH AIR FORCE AND FIFTEENTH AIR FORCE AGAINST OIL REFINERIES THROUGHOUT ITALY, GERMANY, AND ROMANIA. FURTHER, THE USSTAF PLANNERS EXPECTED THE GERMANS TO RESPOND TO THESE ATTACKS WITH VIGOROUS RECONSTRUCTION EFFORTS. THEREFORE, THE OIL PLAN CALLED FOR THE BOMBERS TO RETURN TO THE TARGETS AGAIN AND AGAIN. IN ALL, THE TWENTY 1944 ATTACKS AGAINST PLOESTI AND THE MANY ATTACKS AGAINST OTHER REFINERIES PROGRESSIVELY BEAT PRODUCTION TO VERY LOW LEVELS.

IN THE PACIFIC, HOWEVER, THE PICTURE WAS MUCH DIFFERENT. KENNEY DID NOT HAVE THE RESOURCES TO AFFECT THE BREADTH OF THE JAPANESE PETROLEUM REFINERY NETWORK. NEVERTHELESS, HE DID MAKE SOME ATTEMPTS AT A BROAD OPERATION. KENNEY UNSUCCESSFULLY PETITIONED ARNOLD TO SEND XX Bomber Command's B-29s AGAINST THE PALEMBANG REFINERIES AT THE SAME TIME AS HIS BALIKPAPAN ATTACKS. A MONTH AFTER THE BALIKPAPAN RAIDS, HE SENT THE



BOMBERS AND FIGHTERS OF THIRTEENTH AIR FORCE ON A SINGLE RAID TO THE CRUDE OIL FIELDS AT PAMOEAN AND DJOEATA ON BORNEO'S TARAKAN ISLAND. THESE ATTACKS HIT FAR TOO FEW TARGETS TO GENERATE THE SHOCK TO THE JAPANESE PETROLEUM INDUSTRY THAT KENNEY WAS CONTEMPLATING. TO DETERMINE THE AMOUNT OF PERSISTENCE REQUIRED AGAINST BALIKPAPAN, FEAFF PLANNERS REVIEWED THE ARMY AIR FORCES EVALUATION BOARD REPORT ON PLOESTI, CONCLUDING THAT FIFTEENTH AIR FORCE HAD ACHIEVED DIMINISHING RETURNS IN TERMS OF DECREASED PETROLEUM PRODUCTION PER ATTACK. PREDICTING A SIMILAR PATTERN AT BALIKPAPAN, FEAFF DECIDED THAT THEY WOULD NOT RETURN TO BALIKPAPAN AFTER THE INITIAL SERIES OF ATTACKS.<sup>369</sup> THIS ANALYSIS INDICATES THAT FEAFF WAS FOCUSED ON PURELY SHORT-TERM OPERATIONAL AND STRATEGIC EFFECTS DURING THE FALL OF 1944. AS THE POST-WAR ANALYSIS INDICATED, HOWEVER, BALIKPAPAN WAS NOT IMPORTANT ENOUGH WITHIN THE JAPANESE PETROLEUM NETWORK TO GENERATE EVEN THESE EFFECTS.

THE REQUIREMENT FOR PERSISTENCE WILL ALWAYS DEPEND ON THE SPECIFIC SITUATION. IF PLANNERS NEED ONLY A SHORT TERM EFFECT, PERSISTENT ATTACKS WILL BE A WASTE OF EFFORT. THIS REQUIRES, OF COURSE, THAT THE TARGET SELECTION PROCESS BE INCISIVE ENOUGH TO ENSURE THAT THIS SMALL WEIGHT OF EFFORT WILL ACHIEVE THE DESIRED RESULTS. IF, ON THE OTHER HAND, AIRPOWER IS ATTEMPTING TO USE CUMULATIVE DESTRUCTION TO PRODUCE A SYSTEM-WIDE FAILURE, PERSISTENCE SHOULD BE A KEY COMPONENT OF THE PLAN. THIS IS PARTICULARLY TRUE IN THE FACE OF AN ENEMY WHO IS CAPABLE OF PERCEIVING AND COUNTERING THE AIR STRATEGY.

IN TOTAL, THEREFORE, USSTAF PROVED MORE ADEPT THAN FEAFF IN LINKING AIR MISSIONS WITH AN EFFECTIVE STRATEGY, RESULTING IN AN IMPORTANT CONTRIBUTION TO ALLIED VICTORY IN EUROPE. TO DO SO, USSTAF WAS FORTUITOUS TO HAVE A HEALTHY MEASURE OF STRONG LEADERSHIP, REFINED INTELLIGENCE, AND AIRPOWER EXPERTISE.

#### THE CAUSES OF TACTICAL SUCCESS

FEAFF, ON THE OTHER HAND, DESERVES THE GREATER CREDIT FOR OVERCOMING THE TACTICAL PROBLEMS INVOLVED WITH BOMBING THE OIL REFINERIES. USSTAF AND FEAFF FACED THE SAME PROBLEMS AT THE BEGINNING OF THEIR OPERATIONS: HIGH LOSSES AND POOR ACCURACY. AS THEIR OPERATIONS PROGRESSED, BOTH ORGANIZATIONS THREW MORE RESOURCES AT THE PROBLEM AND INSTIGATED A NUMBER OF TACTICAL INNOVATIONS. FEAFF, HOWEVER, WAS ABLE TO COMBINE ALL OF THESE FOR A DRAMATIC TACTICAL PAY-OFF AT THE END OF THE OPERATION. FEAFF'S ABILITY TO DO THIS WAS A FUNCTION OF KENNEY'S LEADERSHIP ATTRIBUTES, THE ORGANIZATIONAL CLIMATE HE ENGENDERED, AND THE RESULTING ABILITY TO INNOVATE RAPIDLY.

LIKE USSTAF, FEAFF REFLECTED THE QUALITIES OF ITS COMMANDER. WHILE SPAATZ'S STRENGTH WAS STRATEGY AND PLANNING, KENNEY WAS A MASTER AT TACTICS AND ENGINEERING. KENNEY'S WAS UNIQUE AMONG THE PLOESTI AND BALIKPAPAN AIR LEADERS IN THAT HE TAUGHT GROUND

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<sup>369</sup> Thirteenth Air Force, *Attacks against Strategic Enemy Oil Centers*, n.p.; Air Evaluation Board, 83-84.

ATTACK AVIATION FOR FOUR YEARS AT THE ARMY'S CENTER FOR AIR EXCELLENCE, THE AIR CORPS TACTICAL SCHOOL. WHILE BRERETON ALSO TAUGHT AT THE ACTS FOR A YEAR, KENNEY'S HANDS-ON APPROACH TO TACTICS IN HIS COMMAND ASSIGNMENTS REFLECTS ON HIS TENURE AT THE SCHOOL. TO THIS TACTICAL FOCUS, KENNEY ADDED A PENCHANT FOR ENGINEERING. BUILDING ON AN ENGINEERING EDUCATION, KENNEY SERVED IN POSITIONS RESPONSIBLE FOR THE PRODUCTION, TESTING, AND EVALUATION OF AIRCRAFT FROM 1939 UNTIL 1942. THESE TWO AREAS OF EXPERTISE, TACTICS AND ENGINEERING, MADE KENNEY A GOOD FIT FOR THE SWPA. UNDERSTANDING THE LIMITS OF THE AIR PROCUREMENT SYSTEM, HE WAS NOT AFRAID TO CREATE LOCAL ENGINEERING SOLUTIONS TO SUPPORT THE REQUIREMENTS OF MACARTHUR'S GROUND CAMPAIGN. DURING THE BALIKPAPAN OPERATION, KENNEY PRODDED SUBORDINATES TO GENERATE NEW TACTICAL AND ENGINEERING SOLUTIONS TO SOLVE THE OBVIOUS OPERATIONAL PROBLEMS.

TO THIS BACKGROUND, KENNEY ADDED STRONG RELATIONSHIPS INSIDE THE SOUTHWEST PACIFIC. KENNEY MAINTAINED A CORDIAL RELATIONSHIP AND OPEN COMMUNICATIONS WITH ARNOLD, BUT HIS CONNECTION TO HIM WAS NOT AS CLOSE AS THAT OF SPAATZ. MORE SIMILAR TO SPAATZ, KENNEY HAD A CLOSE RELATIONSHIP WITH HIS THEATER COMMANDER, MACARTHUR, WHICH PROVIDED HIM CONSIDERABLE FREEDOM OF ACTION. KENNEY WAS TRULY UNIQUE, HOWEVER, IN THE STRONG CONNECTIONS HE CREATED DOWN THE CHAIN OF COMMAND. KENNEY'S DIARY AND AUTOBIOGRAPHY ARE FILLED WITH THE EXPLOITS OF THE INDIVIDUALS IN HIS COMMAND. AS A MORE EXTREME EXAMPLE OF THIS BOND, KENNEY WROTE A BIOGRAPHY OF HIS FAVORITE ACE, RICHARD BONG, IN THE YEARS FOLLOWING THE WAR. KENNEY CONSTANTLY TRAVELED TO HIS SUBORDINATE COMMANDS TO STAY IN TOUCH WITH THE PEOPLE AND OPERATIONS. DURING THE BALIKPAPAN OPERATION, KENNEY TRAVELED TO NOEMFOOR, PEPPED UP THE THIRTEENTH AIR FORCE CREWS, AND ACTED ON THEIR CONCERNS. KENNEY'S KEY LEADERS MIMICED THIS LEADERSHIP STYLE. THE V AND XIII FIGHTER COMMANDS, FOR EXAMPLE, HAD TALENTED AVIATORS IN CHARGE WHO KEPT THEIR HEADQUARTERS AT THE FORWARD FIGHTER GROUP BASES. THIS CLOSE CONNECTION BETWEEN LEADERS AND THE LOWEST LEVEL SUBORDINATES ALLOWED KENNEY TO QUICKLY GAUGE THE TREND OF OPERATIONS AND TO SOLICIT RECOMMENDATIONS FROM THOSE MOST DIRECTLY INVOLVED IN OPERATIONS

CREWS IN THE FIFTEENTH AIR FORCE UNDOUBTEDLY DID NOT FEEL THIS LEVEL OF CONNECTION WITH SPAATZ. THROUGHOUT THE 1944 BOMBING, SPAATZ REMAINED IN ENGLAND WHERE HE COULD DEDICATE THE BULK OF HIS ATTENTION TO THE PREPARATION FOR OVERLORD AND THE DIRECTION OF EIGHTH AIR FORCE, HIS LARGEST SUBORDINATE UNIT. SPAATZ LARGELY LEFT TACTICAL ISSUES TO TWINING AT FIFTEENTH AIR FORCE AND EAKER AT MEDITERRANEAN ALLIED AIR FORCES. THESE MEN WERE EXPERIENCED AIRMEN WHO ACCOMPLISHED THEIR TASKS SKILLFULLY. NONETHELESS, IT WAS EASY FOR SPAATZ AND THE USSTAF PLANNERS TO BECOME DISCONNECTED FROM THE PROBLEMS OF THE INDIVIDUAL AIRCREW ON OPERATIONS OVER ROMANIA.

COMMANDERS NOT ONLY INFLUENCE THEIR SUBORDINATES' BEHAVIOR THROUGH PERSONAL CONTACT BUT ALSO THROUGH THE ORGANIZATIONAL STRUCTURES THEY CREATE. OF ALL THE

ORGANIZATIONAL TRADE-OFFS LEADERS MUST MAKE, TWO OF THE MOST ELEMENTAL ARE FLEXIBILITY AND STRUCTURE. FEAF AND USSTAF APPROACHED THIS PROBLEM FROM DISTINCTLY DIFFERENT DIRECTIONS. USSTAF, WITH ITS IMMENSE SIZE, FAVORED STRUCTURE RATHER THAN FLEXIBILITY. USSTAF'S STRUCTURE WAS NOT ONLY VERY VERTICAL; PORTIONS OF IT WERE ALSO QUITE COMPLICATED. USSTAF CONTROLLED TWO AIR FORCES, EIGHTH AND FIFTEENTH. FIFTEENTH AIR FORCE, HOWEVER, WAS UNDER THE ADMINISTRATIVE CONTROL OF MEDITERRANEAN ALLIED AIR FORCES, WHICH ALSO RETAINED OPERATIONAL CONTROL FOR NON-STRATEGIC MISSIONS. BELOW THIS, FIFTEENTH AIR FORCE UNITS WERE FURTHER DIVIDED INTO COMMANDS (FOR THE FIGHTERS), THEN WINGS, THEN GROUPS, THEN SQUADRONS. THE SPAN OF CONTROL FOR SOME OF THESE ORGANIZATIONS WAS VERY LARGE, WITH THE 5<sup>TH</sup> BOMB WING, FOR EXAMPLE, COMMANDING SIX BOMBER GROUPS. THIS LARGE ORGANIZATION, THEREFORE, WAS VERY DIFFICULT TO REDIRECT WITH IDEAS PERCOLATING TO THE TOP RELATIVELY SLOWLY. THE INDIVIDUAL AIRCREW MEMBER OR EVEN A GROUP COMMANDER MUST HAVE FELT POWERLESS TO EFFECT EVEN MINOR TACTICAL CHANGES. ON THE OTHER HAND, FIFTEENTH AIR FORCE WAS A HIGHLY DISCIPLINED AND STANDARDIZED ORGANIZATION, AND THE GROUPS BECAME PROFICIENT FLYING IN LARGE SECTIONS AND COMPLETING COMPLEX TACTICAL TASKS.

IN SWPA, KENNEY SOUGHT TO MAINTAIN A FLEXIBLE ORGANIZATION BY CREATING A RELATIVELY FLAT COMMAND STRUCTURE. THIS WAS RELATIVELY EASY IN FEAF DUE TO THE SMALL SIZE OF THE COMMAND. WITH SUCH A LIMITED NUMBER OF GROUPS, KENNEY DISPENSED WITH THE WING STRUCTURE ALTOGETHER. EVEN WITH THIS, HOWEVER, KENNEY APPEARED TO RETAIN UNNECESSARY OVERHEAD WITH THE SMALL FIFTH AND THIRTEENTH AIR FORCES. KENNEY MAINTAINED BOTH HEADQUARTERS CONSCIOUSLY, THOUGH. PRIMARILY, HE WAS PREPARING TO SPLIT HIS FORCES TO GEOGRAPHICALLY SEPARATED OPERATIONS AS THE WAR SPREAD OUT IN THE PHILIPPINES. HOWEVER, KENNEY ALSO INTENDED TO USE THE TWO AIR FORCE HEADQUARTERS TO FACILITATE RAPID, SEQUENTIAL OPERATIONS WHEN THE COMMANDS OCCUPIED THE SAME AREA. THE BALIKPAPAN OPERATION WAS THE PERFECT EXAMPLE OF THIS, AS KENNEY GAVE THIRTEENTH AIR FORCE THE PLANNING RESPONSIBILITY AND OPERATIONAL CONTROL OF ALL THE NECESSARY FEAF FIGHTER AND BOMBER GROUPS. THIS CREATED A LARGE, FLAT THIRTEENTH AIR FORCE COMBAT STRUCTURE, WHILE FREEING THE FIFTH AIR FORCE HEADQUARTERS TO PLAN FOR THE PHILIPPINES. ONCE TASK ORGANIZED, THE FEAF GROUPS DEMONSTRATED A LEVEL OF INTERACTION THAT WAS UNHEARD OF IN EUROPE. THIS FLEXIBLE COMMAND STRUCTURE WAS NOT WITHOUT COSTS, HOWEVER. IN ADDITION TO THE PERSONNEL REQUIREMENTS OF TWO NUMBERED AIR FORCE HEADQUARTERS, THE DIFFERENT HALVES OF FEAF RETAINED DISSIMILAR SKILL SETS AND LEVELS OF CAPABILITY. THIS WAS EVIDENT IN THE CONTINUING COORDINATION FOUL-UPS BETWEEN FIFTH AND THIRTEENTH AIR FORCE BOMBERS DURING THE COMPLICATED BALIKPAPAN STRIKES.

ALL MILITARY ORGANIZATIONS HAVE SOME LEVEL OF PERMANENT STRUCTURE, AS THIS ALLOWS COMMANDERS TO DEFINE SUBORDINATE RESPONSIBILITIES, DISTRIBUTE THE WORKLOAD, STANDARDIZE PROCEDURES IN SIMILAR UNITS, AND ALLOW UNIQUE UNITS TO GAIN EXPERTISE. HOWEVER, THIS SAME

STRUCTURE CAN OFTEN INHIBIT THE UNIT FROM ADAPTING QUICKLY IN THE FACE OF A REACTIVE ENEMY. THE KEY, OF COURSE, IS FOR LEADERS TO TRY TO TAKE THE BEST OF BOTH WORLDS. LEADERS SHOULD RECOGNIZE THE EFFICIENCIES IN TRAINING, STANDARDIZATION, EASE OF TASKING, AND PERSONNEL SAVINGS GENERATED BY TRADITIONAL HIERARCHICAL STRUCTURES. AT THE SAME TIME, LEADERS SHOULD BE AWARE OF THE TACTICAL FLEXIBILITY AND RAPIDITY OF OPERATIONS THAT CAN RESULT FROM HAVING MULTIPLE ORGANIZATIONS THAT CAN BE TASK ORGANIZED FOR THE MISSION AT HAND.

THE LEADERSHIP INFLUENCES AND ORGANIZATIONAL STRUCTURE OF FEAFF AND USSTAF MANIFESTED THEMSELVES IN THE RATE OF TACTICAL INNOVATION THAT EACH ORGANIZATION DEMONSTRATED DURING THE OIL REFINERY BOMBINGS. IN THE PLOESTI OPERATION, FIFTEENTH AIR FORCE INTRODUCED EIGHT MAJOR TACTICAL INNOVATIONS: THE INITIAL RETURN TO HIGH-ALTITUDE BOMBING, FIGHTER ESCORT, LOW-ALTITUDE ATTACK BY FIGHTER BOMBERS, BLIND BOMBING TECHNIQUES (RADAR AND OFFSET), GEOGRAPHICALLY SPREAD ATTACK, SPOTTER AIRCRAFT, A LONG BOMBER STREAM, AND FIGHTER SWEEPS AGAINST THE DEFENDING AIRFIELDS. HOWEVER, THESE INNOVATIONS WERE SPREAD ACROSS TWENTY PLOESTI MISSIONS (AND A LARGE NUMBER OF OTHER MISSIONS) THAT SPANNED MORE THAN FIVE MONTHS OF AIR COMBAT. ADDITIONALLY, FIFTEENTH AIR FORCE NEVER INTRODUCED MORE THAN ONE MAJOR CHANGE ON ANY MISSION. AS SUCH, THE GERMAN DEFENDERS KEPT PACE. AS THE AMERICANS' NEW TACTICS GROUND DOWN THE GERMAN AND ROMANIAN FIGHTERS, THE ANTI-AIRCRAFT DEFENSES INCREASED THEIR NUMBERS AND PLACEMENT TO COMPENSATE. AS A RESULT, LOSS RATES WERE HIGHER AT DURING THE LAST MONTH OF THE OPERATION THAN THEY WERE DURING THE FIRST. AGAINST THE PASSIVE DEFENSES, FIFTEENTH AIR FORCE'S ATTEMPTS TO IMPROVE BOMBING METHODS WERE ONLY PARTIALLY SUCCESSFUL AGAINST THE PROGRESSIVELY MORE COMPLETE GERMAN SMOKE SCREEN, REDUCING THE RESULTS OBTAINED FOR THE HEAVY LOSS OF AIRCRAFT AND CREWS.

THE SITUATION WAS RADICALLY DIFFERENT IN THE PACIFIC. FEAFF INTRODUCED SIX SIGNIFICANT TACTICAL CHANGES DURING THE BALIKPAPAN RAIDS: TARGET AREA FIGHTER ESCORT, A CHAFF CORRIDOR, NIGHT HARASSMENT BOMBING, DEFENSIVE BOMBER FORMATIONS, COMPRESSED TARGET TIMES, PAYLOAD CHANGES, AND EN-ROUTE FIGHTER ESCORT. FEAFF, THEREFORE, PRODUCED FEWER TACTICAL CHANGES THAN USSTAF. HOWEVER, THE PACIFIC PLANNERS INTRODUCED ALL OF THESE INNOVATIONS IN ONE MISSION. IT IS IMPORTANT TO NOTE THAT NOT ALL OF THE TACTICS WORKED OUT. THE CHAFF CORRIDOR, IN PARTICULAR, WAS INEFFECTIVE DUE TO SPOTTER AIRCRAFT. NONETHELESS, ENOUGH OF THE INNOVATIONS WORKED TO DISRUPT SIGNIFICANTLY THE JAPANESE DEFENSES. THE RESULT WAS A DRAMATIC DROP IN THE LOSSES ACCOMPANIED BY AN EQUALLY DRAMATIC INCREASE IN BOMBING ACCURACY.

THE LESSON OF THESE OPERATIONS IS THAT THE RATE OF CHANGE CAN BE JUST AS SIGNIFICANT AS THE NUMBER OR EXTENT OF TACTICAL INNOVATIONS IN ATTEMPTING TO UNBALANCE A REACTIVE ENEMY. THIS OBSERVATION TIES IN NEATLY WITH THE WAR-FIGHTING THEORIES JOHN BOYD, WHO EMPHASIZED THE IMPORTANCE OF USING UNEXPECTED AND UNFAMILIAR ACTIONS TO INCREASE THE TIME

REQUIRED FOR THE ENEMY TO ORIENT HIMSELF TO THE NEW SITUATION AND REACT APPROPRIATELY. IF THE COMBATANT CAN INCREASE THE SIZE OF THE ENEMY'S OODA (OBSERVE, ORIENT, DECIDE, AND ACT) LOOP RELATIVE TO HIS OWN, HE CAN CONTINUALLY OPERATE WITH THE UPPER HAND.

EVERY MILITARY ORGANIZATION STRIVES TO INNOVATE RAPIDLY IN WAR. THE PLOESTI AND BALIKPAPAN OPERATIONS DEMONSTRATE THAT MUCH OF THIS ABILITY IS PREDICATED ON THE LEADERSHIP ATTRIBUTES AND ORGANIZATIONAL STRUCTURES THAT HAVE MATURED YEARS PRIOR TO THE STRESS OF COMBAT.

## CONTINUING ISSUES

NEITHER USSTAF NOR FEAFF ADEQUATELY DEALT WITH CERTAIN ISSUES DURING THE REFINERY BOMBINGS. FIRST, BOTH ORGANIZATIONS WERE INTELLECTUALLY CONSTRAINED BY PRE-WAR DOCTRINE, AND THUS WERE UNABLE TO SEE CERTAIN TACTICAL AND STRATEGIC OPPORTUNITIES. SECOND, FEAFF AND USSTAF BOTH STRUGGLED THROUGHOUT THE WAR TO FIND SATISFACTORY MEANS TO ASSESS THE PROGRESS OF THEIR OPERATIONS.

DOCTRINE OFTEN SERVES AS AN EASY TARGET FOR THE CRITIC OF MILITARY OPERATIONS. THIS IS PARTICULARLY TRUE IN THE WWII AIR WAR, SINCE THE RAPID ADVANCE OF AIRCRAFT TECHNOLOGY MADE SO MUCH OF THE PRE-WAR DOCTRINE SPECULATIVE. THE INADEQUACIES OF THE AAF'S INDUSTRIAL WEB AND UNESCORTED HIGH-ALTITUDE PRECISION DAYLIGHT BOMBING DOCTRINES BECAME GLARINGLY OBVIOUS DURING EARLY BOMBING OPERATIONS IN EUROPE. TO SOME DEGREE, BOTH SPAATZ AND KENNEY OWED THEIR SUCCESS TO THEIR ABILITY TO GO BEYOND THIS PRE-WAR DOCTRINE. IN PARTICULAR, SPAATZ' CREATION OF THE OIL PLAN, WITH ITS FOCUS ON THE EFFECTS AGAINST THE FIELDED FORCES, WAS A STEP AWAY FROM THE INDUSTRIAL WEB THEORY.

NEVERTHELESS, THE DECADES OF INDOCTRINATION BEFORE THE WAR CLOSED THE EYES OF BOTH LEADERS TO OTHER OPPORTUNITIES. THE MOST PRESCIENT EXAMPLE OF THIS INVOLVES THE TARGET CHOSEN TO DISRUPT THE PETROLEUM INFRASTRUCTURE IN EACH THEATER. BOTH USSTAF AND FEAFF CONCENTRATED ON A REFINERY COMPLEX THAT WAS THE EMBODIMENT OF THE CRITICAL, SINGLE-POINT TARGET IN THE ACTS THEORY. IN DOING SO, BOTH ORGANIZATIONS IGNORED THE LESS CONCENTRATED BUT FAR MORE VULNERABLE TRANSPORTATION SYSTEMS THAT CARRIED THE OIL BEYOND THE REFINERY WALLS. POST-WAR INFORMATION IN EUROPE REVEALED THE UNEXPECTED EFFICACY OF THE RELATIVELY MINOR ALLIED EFFORTS TO BOMB ROMANIAN OIL SHIPMENT POINTS AND TO MINE THE DANUBE RIVER. LIKEWISE, POST-WAR DATA FROM JAPAN SHOWED THAT THE FRAGILITY OF THE JAPANESE SHIPPING INDUSTRY HAD ALREADY MADE BALIKPAPAN IRRELEVANT BEFORE THE BOMBERS STRUCK.

MILITARY ORGANIZATIONS NEED DOCTRINE. SIMPLY PUT, DOCTRINE IS THE ARTICULATION OF THE MILITARY ORGANIZATION'S VIEW OF THE BEST WAY TO EMPLOY COMBAT POWER. INEVITABLY, THE MILITARY BUILDS DOCTRINE ON OPERATIONAL EXPERIENCE BUT THEN MODIFIES IT TO ACCOMMODATE

NEW WEAPONS AND TECHNIQUES. DOCTRINE PROVIDES THE ESSENTIAL INTELLECTUAL UNDERPINNING FOR THE ORGANIZATION. IN PARTICULAR, THIS GIVES THE ORGANIZATION A COMMON VOCABULARY AND A COHERENT FRAMEWORK FOR FORCE DEVELOPMENT, PLANNING, TRAINING, AND TACTICS. HOWEVER, AN ORGANIZATION'S DOCTRINAL SYSTEM CAN FAIL UNLESS IT IS ABLE TO CHANGE. MILITARY ORGANIZATIONS SHOULD ACKNOWLEDGE THE DEGREE TO WHICH THEIR DOCTRINE IS BASED ON SPECULATION, AND DEVELOP PROCESSES TO RAPIDLY ADAPT DOCTRINE RESPONSE TO A REACTIVE ENEMY.

NO MATTER WHAT THE OBJECT OF THEIR EFFORTS, WWII AIR LEADERS STRUGGLED TO GATHER THE NECESSARY INTELLIGENCE TO ASSESS THEIR PROGRESS. IN THE PLOESTI RAIDS, FIFTEENTH AIR FORCE SELDOM RECEIVED USEFUL STRIKE PHOTOGRAPHS, SINCE THE BOMBERS WERE USUALLY DROPPING ORDNANCE THROUGH HEAVY SMOKE. ADDITIONALLY, POST-STRIKE RECONNAISSANCE WAS SOMETIMES PROBLEMATIC, AS EUROPE'S POOR WEATHER PLAGUED RECONNAISSANCE AIRCRAFT AS MUCH AS THE BOMBERS. THE PHOTOGRAPHS FIFTEENTH AIR FORCE DID RECEIVE WERE OF HIGH ENOUGH QUALITY TO PLOT THE BOMB HITS; HOWEVER, THIS DID NOT ALLOW ANALYSTS TO DEVELOP A COMPLETE PICTURE OF DAMAGE. IN MOST CASES, THE PHOTOGRAPHS LED ANALYSTS TO OVERESTIMATE THE DAMAGE. FOR EXAMPLE, ANALYSTS DECLARED REFINERIES INOPERATIVE BASED ON DAMAGE TO BOILER HOUSES, WHEN IN ACTUALITY THE BOILERS INSIDE WERE STILL IN WORKING CONDITION. SOME OF THE OVERESTIMATES WERE A RESULT OF DELIBERATE GERMAN DECEPTION. IN SOME CASES, THE GERMANS IGNITED STREAMS OF OIL IN OUTLYING FIELDS, WHICH RECONNAISSANCE THEN REPORTED AS HUGE FIRES. IN A SMALLER NUMBER OF CASES, PHOTOGRAPHIC INTELLIGENCE PROVIDED AN UNDERESTIMATE OF RESULTS. IN A PARTICULARLY TELLING EXAMPLE, A DUD BOMB HIT THE PRIMARY PIPE AT THE ROMANA AMERICANA REFINERY. ALTHOUGH THIS WEAPON PROVIDED NO DISCERNABLE DAMAGE FROM THE AIR, IT CONSIDERABLY LOWERED PRODUCTION IN THE LARGE REFINERY DURING JUNE AND JULY. WHAT WAS MOST DIFFICULT TO SHOW IN PICTURES, OF COURSE, WAS THE TREMENDOUS MANPOWER GERMANY COMMITTED TO RESTORING THE REFINERIES TO OPERATION.<sup>370</sup> TO THEIR CREDIT, AMERICAN INTELLIGENCE AGENCIES ATTEMPTED TO SUPPLEMENT THEIR PHOTOGRAPHIC INTELLIGENCE WITH HUMAN SOURCES, BUT IT IS NOT CLEAR THAT THIS EFFORT YIELDED ANY TIMELY BENEFITS.<sup>371</sup> WITH AN INCOMPLETE PICTURE OF THE TRUTH AT PLOESTI, FIFTEENTH AIR FORCE CONTINUED TO POUND BOTH ACTIVE AND DEFUNCT REFINERIES ALIKE UNTIL DAYS BEFORE THEIR CAPTURE BY THE SOVIETS.

IN THE BALIKPAPAN RAIDS, LACK OF ADEQUATE ASSESSMENT LED TO A SIMILAR WASTAGE OF EFFORT. THE POOR WEATHER ALLOWED LITTLE DAMAGE ASSESSMENT OF THE FIRST RAID. EVEN IF PHOTOGRAPHIC RECONNAISSANCE HAD BEEN MORE USEFUL, FFAF INTELLIGENCE WOULD HAVE NEVER DETECTED THAT THE PANDASARI REFINERY WAS TEMPORARILY OUT OF SERVICE DUE TO ITS EMERGENCY SHUT-DOWN PROCEDURE. THESE ASSESSMENT PROBLEMS CONTINUED THROUGHOUT THE OPERATION. UNAWARE OF THE FULL EXTENT OF THE DAMAGE ON THE 14 OCTOBER RAID, FFAF PLANNED A FINAL,

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<sup>370</sup> Army Air Forces Evaluation Board, 14-16.

<sup>371</sup> JOSEPH E. PERSICO, *PIERCING THE REICH: THE PENETRATION OF NAZI GERMANY BY AMERICAN SECRET AGENTS DURING WORLD WAR II* (NEW YORK: BALLANTINE BOOKS, 1979), 288.

UNNECESSARY STRIKE. IN DOING SO, FEAF WAS FAIRLY LUCKY THAT WEATHER ALONE CAUSED BUT A FEW LOSSES ON THIS ABORTIVE ATTEMPT.

BOTH BOMBING OPERATIONS, THEREFORE, HIGHLIGHTED THE INADEQUACY OF PHOTOGRAPHIC INTELLIGENCE AS A SOLE SOURCE FOR DAMAGE ASSESSMENT. THIS PROBLEM, OF COURSE, RESONATES WITH SIMILAR COMPLAINTS ABOUT US BATTLE DAMAGE ASSESSMENTS SINCE THE GULF WAR. WHILE PHOTOGRAPHIC INTELLIGENCE IS AN INDISPENSABLE TOOL IN MODERN WARFARE, IT IS OFTEN EITHER UNRELIABLE OR UNABLE TO SHOW A LEVEL OF DETAIL NECESSARY TO ASSESS ACCURATELY THE BOMBING EFFECTS. THE KEY, THEN, IS TO HAVE INTELLIGENCE ORGANIZATIONS THAT ARE PREPARED TO WEAVE INTELLIGENCE FROM A VARIETY OF SOURCES (PHOTOGRAPHIC, COMMUNICATIONS, AND HUMAN, AMONG OTHERS) INTO A DETAILED, ADAPTIVE, AND RESILIENT PICTURE OF THE ENEMY.

THE PLOESTI AND BALIKPAPAN OPERATIONS THUS PROVIDE CLEAR WARNINGS CONCERNING DOCTRINE AND ASSESSMENT. ADMITTEDLY, THE SOLUTIONS ARE MORE AMBIGUOUS. OF NECESSITY, THOUGH, THEY REQUIRE MILITARY ORGANIZATIONS TO LAY THE GROUNDWORK FOR COMBAT LONG BEFORE THE SHOOTING STARTS. THEY MUST HAVE COMBAT LEADERS WITH THE INTELLECTUAL BREADTH TO GENERATE ALTERNATIVE VIEWS AND DOCTRINAL PROCESSES THAT CAN QUICKLY EMBRACE THESE CHANGES. ORGANIZATIONS MUST ALSO INVEST IN INTELLIGENCE STRUCTURES THAT MAY SEEM EXORBITANTLY EXPENSIVE UNTIL THE SHOOTING STARTS.

## CONCLUSION

WHILE THE PLOESTI AND BALIKPAPAN OPERATIONS OCCURRED WITH LITTLE INFLUENCE ON ONE ANOTHER, THERE ARE SOME STRIKING SIMILARITIES AND CONTRASTS. AN ANALYSIS OF THESE PROVIDES NO CONCRETE LAWS FOR THE CONDUCT OF FUTURE MILITARY OPERATIONS. HOWEVER, THE OUTCOME OF THE EUROPEAN AND PACIFIC OIL OPERATIONS DOES PROVIDE APPETIZING CLUES AS TO THE ATTRIBUTES OF LEADERS, ORGANIZATIONS, AND OPERATIONAL TECHNIQUES THAT CAN WEATHER THE PASSAGE OF TIME.

## CONCLUSION

PLOESTI REMAINS THE IN THE US AIR FORCE'S CONSCIOUSNESS IF FOR NO OTHER REASON THAN FOR THE FIVE MEN WHO EARNED THE CONGRESSIONAL MEDAL OF HONOR DURING THE 1 AUGUST 1943 ATTACK. THE STORY OF BALIKPAPAN, IN CONTRAST, IS NOW LITTLE KNOWN. HOWEVER, BOTH OPERATIONS CONTAIN ASPECTS THAT REVERBERATE WITH EVENTS OF MORE RECENT TIMES.

AT THE MOST TACTICAL LEVEL, KNOWLEDGE OF THIS HISTORY PROVIDES PRUDENT WARNINGS FOR OPERATORS AS WELL AS PLANNERS. THE UNEXPECTED LETHALITY OF ANTI-AIRCRAFT FIRE TO LOW-LEVEL AIRCRAFT EVIDENCED ON THE TIDAL WAVE ATTACK ECHOED IN THE EXTENSIVE DAMAGE TO APACHE HELICOPTERS OF THE 11<sup>TH</sup> AVIATION REGIMENT OVER KARBALA DURING THE SECOND GULF WAR. THE LOSSES INCURRED DURING DAYLIGHT ATTACKS ON BAGHDAD IN THE FIRST GULF WAR AND DURING LINEBACKER II EIGHTEEN YEARS EARLIER REITERATED THE NEED FOR ADEQUATE FORCE PROTECTION EVIDENT IN BOTH PLOESTI AND BALIKPAPAN OPERATIONS. MOST IMPORTANTLY, THE WWII OPERATIONS PROVIDE THE TIMELESS USEFUL ADMONITION NOT TO UNDERESTIMATE THE ENEMY, EVEN IF THE ENEMY SEEMS IN DECLINE.

THE BROADER LESSONS FROM THE REFINERY BOMBINGS HAVE PLAY IN CURRENT DEBATES. THE CONTRIBUTION OF EDUCATION AND UNIQUE EXPERIENCES TO THE CAPABILITY OF KEY WWII LEADERS MAY ILLUMINATE CURRENT DEBATE OVER THE VALUE AND COMPOSITION OF MILITARY EDUCATION AND CAREER PATHS. THE DIFFICULTY SPAATZ AND KENNEY EXPERIENCED IN DEVELOPING ACCURATE STRATEGIC INTELLIGENCE REVEALED MANY OF THE SAME ISSUES THAT US LEADERS FACED BEFORE THE SEPTEMBER 11, 1991 TERROR ATTACKS AND THE SECOND GULF WAR. FINALLY, THE BENEFITS AND PITFALLS OF USSTAF AND FEAFF'S ORGANIZATIONAL STRUCTURES PROVIDE POINTERS FOR THOSE ATTEMPTING TO TRANSFORM THE MILITARY TODAY.

AT THE HIGHEST LEVEL, SPAATZ AND KENNEY SHOWED THE AGELESS DIFFICULTY IN FORMULATING EFFECTIVE STRATEGY. BOTH OPERATED IN AN ENVIRONMENT OF CONSTRAINED AND CONTRADICTORY INFORMATION, YET HAD TO LINK THE LIMITED RESOURCES AT THEIR DISPOSAL WITH AN ACHIEVABLE OPERATIONAL CONCEPT TO CREATE A STRATEGICALLY EFFECTIVE OUTCOME. PLOESTI AND BALIKPAPAN SHOW HOW TENUOUS MANY OF THESE LINKS CAN BE.

MORE THAN ANYTHING ELSE, PLOESTI AND BALIKPAPAN SHOW THE ABILITY OF WELL-TRAINED AND DISCIPLINED CREWS TO PERSEVERE IN EXTREME CRISIS, INNOVATE IN THE FACE OF THE ENEMY, AND ULTIMATELY TO ACHIEVE EVEN THE MOST DIFFICULT OF GOALS.



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